The Builder.

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ILLUSTRATIONS.

New Museum and Technical Schools, Liverpool: Detail of Portion of South Front ..... Mr. E. W. Mountford, F.R.I.B.A., Architect.
The New Town Hall at Marlborough ..... Mr. C. E. Ponting, F.S.A., Architect.
A Town Hall for a London Borough ..... Design by Mr. F. W. Newman.
"Lyndhurst," Weston-super-Mare ..... Mr. T. Ramsay Cox, Architect.
A Residence ..... Mr. A. W. Cooksey, A.R.I.B.A., Architect.

Blocks in Text.

Baalbek, Entrance to Excavations ..... Page 29
Baalbek, Syria, in 1901 ..... „ 30
Rock Altar, Baalbek ..... Page 31
Diagrams Illustrating Concrete and Brick Construction ..... „ 36-87
Memorial Brass to Sir Arthur Blomfield in St. Mary's Church, Bryanston-square ..... Page 39

CONTENTS.

The Germans at Baalbek 29
Old Masters at Burlington House 31
Notes 33
Competition for New Offices for the Hearts of Oak Benefit Society 35
Concrete and Brick Construction with Continuous Interwoven Metallic Cores 35
The Royal Institute of British Architects 37
Architectural Societies 39
Memorial Brass to Sir Arthur Blomfield 39
Engineering Societies 39
Sanitary Inspectors' Association 39
Illustrations:—
New Town Hall, Marlborough 40
Illustrations:—
Liverpool Technical School: Detail of Portion of South Front 40
Design for a Town Hall for a London Borough 40
"Lyndhurst," Weston-super-Mare 40
A Country Residence 40
The Architectural Association 40
Trade Catalogues 44
Books Received 44
Correspondence:—
The Direct Employment of Labour 44
Liverpool Cathedral 44
The Hawick Library Competition 45
Baptist Church-House Tenders 45
Correspondence:—
Sir William Chambers 45
Mr. Brewer's Drawings of Old London 46
The Student's Column.—Drainage and Private Sewage Disposal—2 46
Obituary 46
General Building News 47
Sanitary and Engineering News 48
Miscellaneous 48
Capital and Labour 48
Recent Patents 48
Meetings 49
Some Recent Sales of Property 49
Prices Current of Materials 49

The Germans at Baalbek.

"The ruins of Baalbec, invisible to the writers of antiquity, excite the curiosity and wonder of the European traveller. I am much better satisfied with Maundrell's slight octavo than with the pompous folio of Doctor Pocock, but every preceding account is eclipsed by the magnificent description and drawings of MM. Dawkins and Wood, who have transported into England the ruins of Palmyra and Baalbec.

The measure of the temple is 200 ft. in length, and 100 ft. in breadth; the front is adorned with a double portico of eight columns; fourteen may be counted on either side, and each column, 45 ft. in height, is composed of three massive blocks of stone or marble. The proportions and ornaments of the Corinthian order express the architecture of the Greeks; but as Baalbec has never been the seat of a monarch we are at a loss to conceive how the expense of these magnificent structures could be supplied by private or municipal liberality. The Orientals explain the prodigy by a never-failing expedient. The edifices of Baalbec were constructed by the fairies or genii. With less absurdity, but with equal ignorance, Abulfeda and Ibu Chankel ascribe them to the Sabæans. 'Non sunt in omni Syriâ ædificia magnificentiora tris' (*Tabula Syriæ*)."
—*Gibbon*: *Cap. LI.*: "The Arab Conquest of Syria."

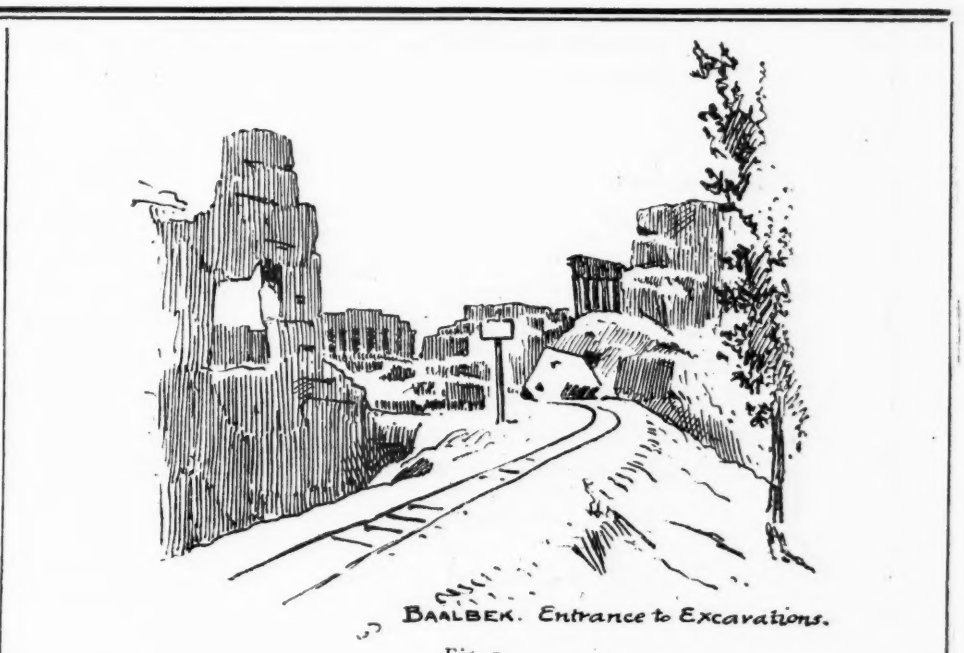

Fig. 1.

THE "unearthing" of the ruins of Baalbek, which the German Government is at present engaged upon, promises to be an important and imposing addition to the series of ancient sites which have been opened up in the Levant during the past half century. The excavations are on the scale of those at Olympia, and the enormous mounds of earth which are slowly accumulating on the north side of the ruins (fig. 1) impress the beholder with the magnitude and thoroughness of the work, and of the vast sums which are being expended upon it.

The following observations on the progress of the work, made on a casual visit, are in anticipation of the exhaustive and voluminous work which will doubtless be published by the authorities in Berlin before very long. As is usual with Germans, the directors of the work at Baalbek meet all inquiries or outside efforts at investigation with suspicion and opposition, but in spite of this dog-in-the-manger spirit the following facts have been gleaned as to the actual discoveries of the last few months.

In the first place the plans of the group of buildings in the Classic period, and in the early Christian and Mediæval Arab times, can now be intelligibly studied. Of the more ancient or prehistoric epoch, before the coming of the Romans, there seem but few traces, but still the centre feature of the whole site, its *raison d'être*, in fact, is of this earlier period and of singular interest as such. This central feature is the rock-hewn altar platform round which the Roman buildings have been planned as an ornamental enclosure.

Referring to the accompanying plan (fig. 2), it will be noticed that the centre of the whole group of buildings is a rock which, in a primitive age, must have risen to a trifling height above the plain or flat level of the valley of Cœlesyria. This rock seems to have been sculptured into one of the not uncommon altar platforms of the prehistoric style. It would probably be one of those altars used for human sacrifice, and at one side are still preserved the rock-hewn steps up which the victims would be led for the purpose (fig. 3). Similar examples of such rock-cut altars occur elsewhere in Palestine and Syria. Previous to the coming of the Romans the rock would probably have retained its natural form, the site being sufficiently conspicuous for the purpose of an open-air assemblage, and the open ground around affording an excellent expanse for the purpose. This rock-hewn altar platform was probably hollow, with a natural cavity like the larger example on Mount Moria, Jerusalem, but this has been a good deal broken through at one side. Inequalities in its squareness of form have been rectified by adding blocks of masonry, which in after times, when the destruction of the monument was contemplated, have been overturned and left abandoned.

The Emperor Caracalla is credited with introducing the Roman architecture on the site, which astonishes if it does not charm the beholder at the present day. But such monuments would require many years for completion, and indeed a great part of the

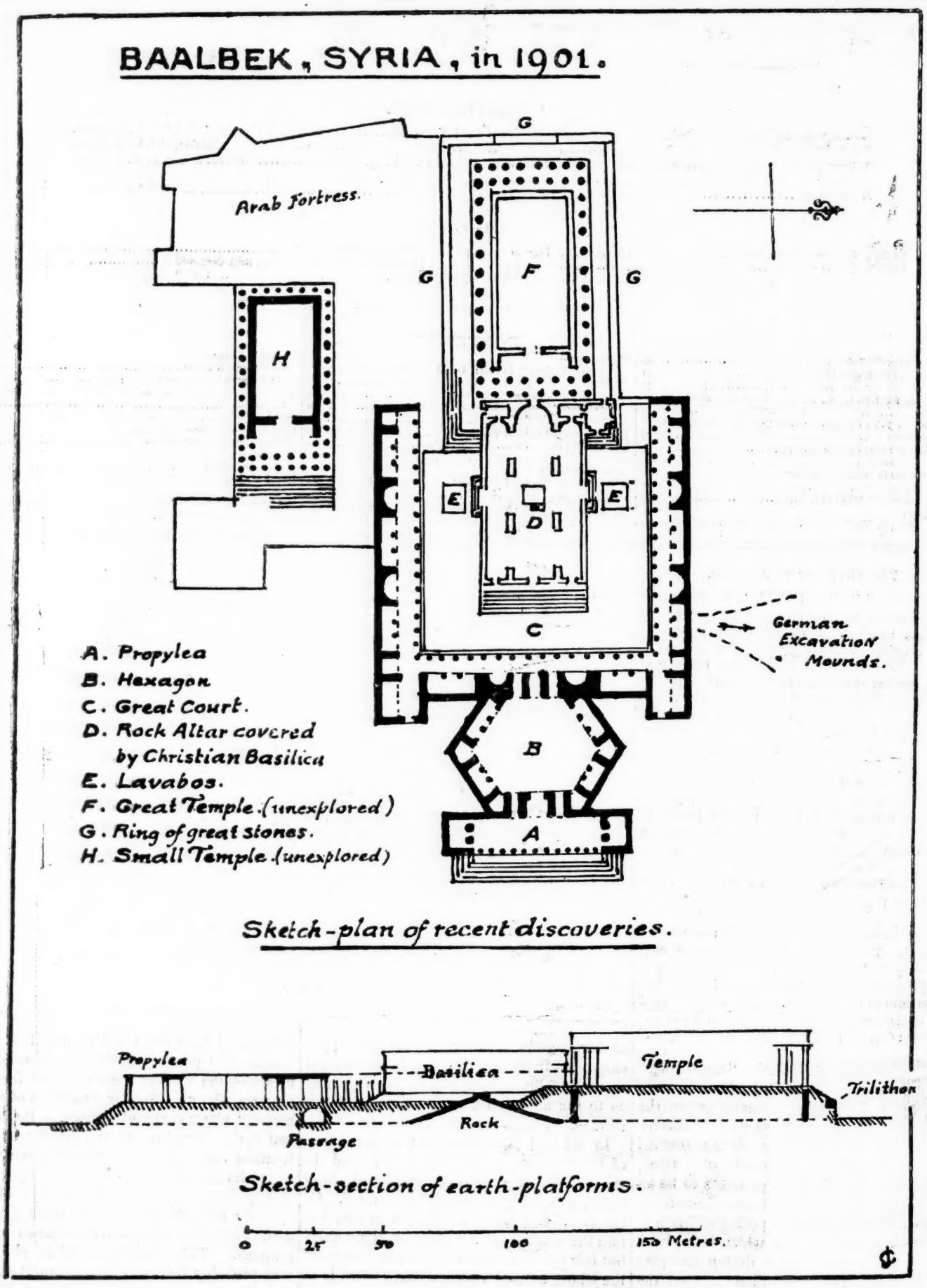

Fig. 2.

buildings bear evidence of never having been completed. In the days of Theodosius, nearly a century later, the work of building the exedræ and outer portions of the group of temples was still going on.

We know so exceedingly little of the religious rites and ceremonies of the ancients and of the systems preceding Christianity that little can be defined as to the destination and use of the different parts of this great monument at Baalbek. The Romans presumably found the rock altar shrine of Baal (or the Sun) in the condition in which it still exists. They surrounded it on all sides by a series of walls making up a terrace or platform level with the base of the altar in a way which was commonly used in fortification. On the east, north, and south sides these walls constituted passages and chambers under the general level of the platform, and on the west side the great temple filled up the space on a huge artificial mound of earth. The basement or lower story of the platform is built of huge blocks of limestone which have never been squared on the face, but only at the jointings. The same system of leaving the masonry to be brought down to a general surface after placing in position has been adopted all over the buildings, sometimes with a finished surface partly completed but with the edges left raised so as to avoid injury to the jointings in the

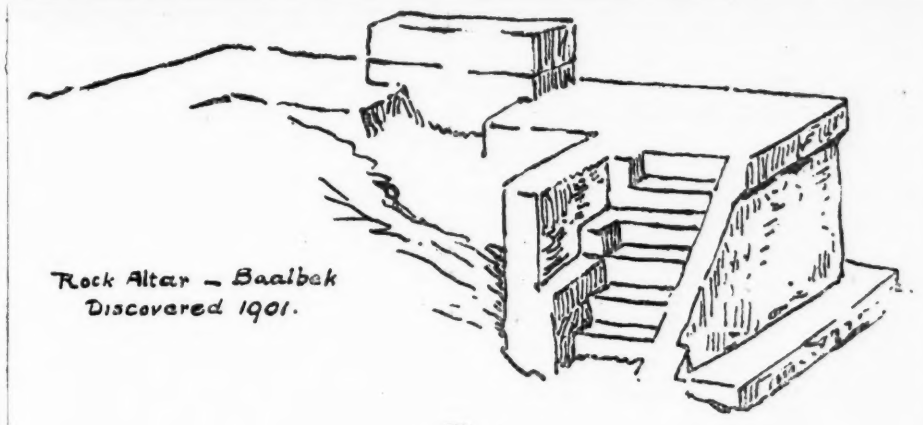

Fig. 3.

process of handling. These raised edges were intended to be removed at the completion of the work.

On the walls of the substructure surrounding the great court of the rock-hewn altar, was raised the singular colonnaded ambulatory with its square and semi-circular chambers. This magnificent colonnade is one of the features of the ancient design which has just been bronght to light. The object of this peculiar arrangement of chambers surrounding the great atrium is not very apparent. On each side of the great altar was a lavabo, or shallow basin of water, formed by a low wall, with sculptured panels on the outside filled with winged genii, &c, and festoons of flowers. In some cases this decoration has been left unfinished; evidently these water-basins were among the latest additions to the monument.

The existing superstructures of the great platform are too well known to need description; but the splendid colonnade which once closed them in had hitherto escaped notice, none of the columns being *en évidence*. It stood on three steps leading down into the great atrium, and probably resembled the design of the three-sided colonnade of the basilica of Constantine at Jerusalem, with which it was almost contemporary.

On the west side of the great atrium stood the famous Roman temple of the Sun, once one of the largest in the world, but now reduced to the insignificant proportions of merely six columns. The Germans have made but slight progress in exploring the heap of earth which still covers up its basement, but sufficient is already laid bare to explain its construction and to account for its ruin. In designing this stupendous building the Roman engineers adopted a system of construction of great originality, but wanting in those elements of stability which we usually associate with the Roman name. On the west side of the great prehistoric altar there had originally been nothing, and here the Romans created a large artificial mound of earth on which to raise their great temple with its floor somewhat above the level of the altar atrium. The atrium was surrounded on three of its sides by a continuous colonnade, and on the fourth the space was occupied by the columns of the temple façade, and the steps leading up to the higher level. The origin and purpose of the famous great stones—the trilithon—which have been the wonder of all ages, are now explained. The great artificial platform of the temple was surrounded on three of its sides with a continuous ring of these enormous stones (60 ft. long) for the purpose of steadying the mound of earth, placed at a distance of about 20 ft. from the substructure supporting the great colonnade, and forming at the same time the lower course of steps of the platform. The three great stones on the west side of the platform have always been exposed to view, those on the south side have only just been discovered and are at present being laid bare. On the other sides of the temple the level of these stones is still covered up with earth and débris, and masked by the Arab fortifications of the Middle Ages. Carrying on to some extent the same idea of construction in all the buildings, the temple and its atrium become the upper story raised about 50 ft. above the original ground or rock level. The lower story consists of long vaults and, in some cases, vaulted apartments, but the chambers which probably exist under the great temple have not yet been found.

The present excavations are not extended much beyond the great atrium, and the result of them is wonderfully interesting and complete. The spectator is able to realise at a glance the original appearance of the monument, whereas before the Germans commenced operations all was chaotic and unintelligible ruin. The destruction of the surrounding colonnade is, unfortunately, complete, but the paving of the great court, the lavabos, &c., seem not to have been at all disturbed.

The original design and destination of the stupendous monument of Baalbek must always be its chief interest, and for the purpose of investigating Classical religious ideas and usages, of which we know really very little, the present exploration will prove of exceptional value. At the same time the subsequent history of the ruins is also of intense interest.

The Classical temple was one of the last to be closed by the edicts of Theodosius, and apparently the army of building operatives which was employed upon it until the very last was provided with work of a new type immediately upon the change of religion. In the centre of the great atrium stand the remains of one of the earliest of the Christian basilicas of the fourth or fifth centuries, North Syrian style. This basilica, perhaps following a local characteristic, is also built on a raised platform of earth, but the earth has been raised in this position for the purpose of covering up the constructions of the Classic period. The early Christians evidently thought to convert the old site to their use, but did not dare to destroy it altogether, so they allowed the rock-hewn altar to remain where it has just been discovered, buried in the centre and under the floor of the new basilica. The three apses of the new basilica were built on the steps of the east front of the temple, and the baptistery seems to have been formed out of an "exedra" or chamber at the same end of the building. The altar of the Christians was, of course, to the west, and the building was covered with wooden roofs supported on nave arcades of phenomenal span.

The ancient enceinte of Baalbek was turned into a regular fortified town during the Byzantine period; a main street lined with dwelling-houses leads down the south side of the great temple, but many of these remains will, of course, be destroyed by the German excavations. The Arab constructions of a still later age will absolutely disappear as the work progresses. Such a fate is, perhaps, inevitable, although much to be regretted. The amount of interesting information which has already been gained upon the subject of the older religion and its monuments must be a compensation for the loss of later history and Arab associations.

As an example of ancient engineering, the method of constructing the great temple is perhaps unique. Its ruin is, however, not so much to be attributed to faulty design—although it was hardly fitted to a country subject to earthquakes—as to the usual destructiveness of the barbarians, who have endeavoured to extract the metal dowells from between the stones. Indeed, considering the way in which the remaining six columns still stand on their precarious bases, with their much injured joints, it would seem as if the human influences for destruction were the chief ones in the case. It is to be hoped efficient means may be taken to prevent the crashing down of these remaining six columns, and it is evident that such means must be adopted before any exploration can take place within the actual area of the temple and its cellar.

In Byzantine times, when the greatest amount of damage was probably done to the site, the earth from the great temple platform was probably removed to a great extent for the purpose of filling up the area round the rock-cut altar. This denudation of the building probably caused a great deal of ruin, and it is this earth which the Germans are now carting away.

OLD MASTERS AT BURLINGTON HOUSE.

THIS is a Claude year at Burlington House, Gallery II. being entirely occupied by twenty-four landscapes of the French master, while some other important examples are distributed in other rooms. It is therefore an occasion to consider seriously what one thinks of Claude.

As our readers are aware, we are not of those who are prepared "jurare in verba magistri" where Ruskin is concerned; but it cannot be denied that Ruskin did a service to modern art-criticism in telling his generation that they ought to revise their opinion of Claude; though, as usual, he drove his opinions home by great and unfair exaggeration, and by unnecessary comparisons with Turner which prove nothing, except that Claude was not Turner. But Claude had been so long accepted by the general public as a name to swear by—ac-

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cepted with so little thought as to what are the real possibilities of landscape-painting, that perhaps only a little rough speaking would have availed to put an end to this popular idolatry.

A good deal of what Ruskin said about Claude was true. His seas are tame, crude, and mechanical; his trees are conventional, and represent no special form of tree, only an idealised tree which suits the composition; a charge which, however, may be equally made against Gaspar Poussin, Salvator, Gainsborough, and many other landscape-painters of the seventeenth and eighteenth centuries; and may even be applied to Corot among the moderns. The conscientious study of trees in their natural variety of foliage and effect is an achievement of modern art; in earlier days a tree was an object serviceable in landscape composition; if it took its place in this it was sufficient that it was a tree; *i.e.*, a growth with branches and foliage; and we have no right to expect more of Claude. His generation looked not for nature in landscape, but for poetic compositions founded on nature; and he, better than most others of his day, gave them what they wanted.

Claude's weakness consists not only in this conventionalism of trees and sea, but in his narrow range of subjects and effects. As we are forcibly reminded in Gallery II., he had practically only two subjects and one effect; the materials are always the same; the arrangement of them, the composition, alone is varied; and even in this respect there is a good deal of repetition of the same formula. There are two Claude pictures, seaport scenes and inland scenes, each of which is repeated over and over again, not however *ad nauseam*—they are too pleasing and (in their way) too poetic for that proverbial expression to be suitable.

It is difficult to realise exactly how far their present appearance coincides with their effect when new. The distance effects were probably very delicate, in many cases, even could we see the painting fresh from the easel; but there seems little doubt that in some cases this delicate and ethereal effect has been enhanced by age. In "La Récompense du Village" (48), for instance, lent by the Earl of Yarborough, the distant hills are almost dreamlike in their faint suggestion, but they look rather as if they had faded into this hazy consistency. What about the figures in the foreground of this picture? They are very carefully painted and highly finished, but are they Claude's? It is known that in some cases the figures in Claude's landscapes were put in by other hands; this looks rather like an instance of it. The Marquis of Lansdowne's small picture, "A Seaport" (47), is one of the best of the seaport scenes; there is a beautiful quiet light about it; the reflection of the sun in the water (not properly vertical to the source of light) looks rather tricky, but in the main this is a good example of its class. Captain Dawson's small landscape (49), with a road and a bridge in the foreground, is admirable in composition but unlike most of the others in colour; it may however be a genuine Claude. The finest picture in the room is undoubtedly Lady Wantage's "The Enchanted Castle" (67), a large work with the castle massed in the centre (an effect imitated occasionally by Turner), and the distance going off on the right in a beautiful gradation of tints. This is a work which sums up all the best qualities of Claude's art. The same delicate treatment of successive planes of distance is seen in Lord Northbrook's "Shepherd and Shepherdess" (56). Among the other works Sir F. Cook's contribution (69) is an exceptionally good composition; Lord Northbrook's "Shepherd playing on a Pipe" (71) is notable both for composition and for a certain softness of texture not usual with Claude (is this also the effect of time?); and Captain Dawson's "View of the Seaport of Ostia" (60) is a curious example of the essentially "stagy" character of some of Claude's pictures of this class, which look exactly as if painted for theatre scenes, though, it must be admitted, exceptionally successful from that point of view. What is usually called the "Black and White Room" is entirely occupied by Claude sketches; not of very great interest except as illustrative of his work.

Generally speaking, and apart from the Claudes, this is one of the least interesting of the Royal Academy's winter exhibitions, if considered from a purely artistic point of view. They have got together, no doubt, some historically interesting examples of painters whose works are not much known in a popular sense, such as the Cassone panels by Pesellino in Gallery I.—works, it must be admitted, rather curious than beautiful. The three small Raphaels in the same room do not raise one's ideal of that great name in painting; but in Gallery III. we have one really important work of the master, the large painting, called the "Colonna" Raphael, of the Virgin and Child enthroned, now in the possession of Mr. Pierpont Morgan (85). This, in general composition, is somewhat of the same type as the Ansidei Madonna, the Virgin being enthroned in front of a kind of decorative screen, with attendant personages on either side of her; the picture however is far inferior to the great example in the National Gallery, and has probably been a good deal painted on and restored; the infant St. John is the only figure which may be said to be in Raphael's highest style of design. In Gallery I. we have one of the editions of Quentin Matsys' "Misers" (24), belonging to Lord Cobham, and which appears to be an original*; and we have a repetition of the "Gioconda" of Leonardo da Vinci (40), lent by Earl Brownlow, the originality of which seems open to question. The backgrounds to Beltraffio's two pictures in this room (27 and 35) are of interest from the nature and amount of work put into them; Lord Northbrook's Luini, "Holy Family" (34), is a fine example of this rather weak and sentimental painter; and in a corner by the door is a specimen of one of Mantegna's strange fancies in monochrome—"Judith with the Head of Holofernes," lent by the National Gallery of Ireland.

Gallery III. contains three large upright Claudes of unequal merit, the landscape representing the ruins of Roman sway (77) being decidedly the finest and the most characteristic of Claude's best qualities. Caracci's hard and mechanical copy of Titian's "Peter Martyr" (81) is interesting as a record of a great work gone for ever; Tintoretto's "Delilah and Samson" (83) a piece of respectable commonplace. There are two Titian portraits, of the Marchese Savagno and of the painter himself (84 and 86), not of the first order of Titians; an interesting and spirited composition of "Adam and Eve" seated, by Bronzino (91); Murillo's "Flight into Egypt" (93), a good example of his life-size *genre* method of treating biblical subjects; an example of Ruysdael's landscape (100) which tends to reconcile one a little to Ruysdael—the colour is poor but the picture is admirably composed and full of movement; and a large Vandyck portrait of a lady and a little girl (102), not an ideal Vandyck, but with a large and grand style about it. One of the most satisfying things in the room is Rubens's "Portrait of a Lady" (78), less ambitious in subject than many others, but full of character and thoroughly satisfactory in execution.

Titian's large group of the Holy Family (larger than life), in Gallery IV., is but a mediocre Titian in style and colour, though there is a certain monumental air about it. Guido's "Sybil" (112) is a very pretty head with nothing of the Sybil about it. On the other hand there is a landscape by Rembrandt, a glade in the middle of a wood (123), which is marked by that extraordinary power and originality that Rembrandt put into everything he touched; his trees are as much generalised trees, have as little of special character, as Claude's, but there is a weight and mass of foliage about them compared with which Claude's plantations have but the effect of stage foliage; the road winds mysteriously away into their gloomy shadows; it is a wood in which a scene from the "Faërie Queene" might be imagined. It is a work that would kill any example of Claude in the gallery, if hung next to it.

In Gallery V. Tintoretto shows a pretty piece of decorative figure composition in his small picture of "Pharaoh's Daughter and the Infant Moses" (149); some portraits of Elizabethan ladies, by unknown artists, are of historical interest as to character and costume; and Lord Windsor has lent, under the title "Four Peasants" (169), a realistic study by Velasquez for his well-known and wonderfully powerful but withal disagreeable picture, "Borrachos," sometimes known as "Les Buveurs." The head of the man holding the wine-cup is almost literally given here, and a splendidly forcible study it is.

Among the small works in the water-colour room, not all of them of much interest, we may direct attention to a superb little Gerard Dow (178) lent by Sir Jas. Carmichael; a charming little sunset Dutch river landscape by Cuyp (180), a small but good Teniers (199), and a picture labelled "French School" (222), a three-quarter figure of a young girl, interesting from its simple and touching expression and character.

There have been loan exhibitions at Burlington House which have sent one away in a state of wonder at the power of many paintings of the older schools, and with the feeling that something has been in the art of painting which has departed, never to be revived. But though we are none the less convinced that this is so, the present exhibition in itself hardly fosters this conviction. It rather sends one away with the feeling how

* We cannot but think that the Royal Academy would greatly aid the educational value of these exhibitions by stating, in their catalogue notes, when a picture is only one of a series of repetitions of a subject, and whether it appears to them to be an original or a copy. They never offer any information on these points.

much there is that we can do better than it was done by many of these Old Masters; how much there is of theirs that is no longer (for us) living or interesting, if people were only candid enough to say so. How many pictures are there in the present collection which would really give pleasure to most people in the present day, if they were not presented under the protection of historic names? Claude indeed maintains his place, for he made a style and a feeling of his own in landscape, beautiful in its way, though conventional in manner and limited in scope. But of Holy Families and such other subjects, is there one here which is really interesting to us, except just as an example of this or that painter's manner of composition and execution? They had a life once, no doubt, but it has gone out now, except in the case of a few examples of transcendent power, in which the art triumphs over the subject. Millais' "Vale of Rest" is worth all the religious pictures in the present exhibition put together. It is better painted than any of them, and it appeals to feelings which are permanent in human nature, and not peculiar to one time more than another. There is a good deal of pretending as to "Old Masters," and it is as well to look facts in the face occasionally, in reference to this as well as other subjects.

NOTES.

The Liverpool Cathedral.

WE may recommend our readers who are interested in this subject to look at the letter by the Hon. Secretary to the "Cathedral Site Petition Committee," printed on another page, in answer to Mr. J. Oldrid Scott's in our last; and we may add that while we are very glad to give space to Mr. Scott as an eminent church architect and the son of a still more eminent one, to state his views, our opinion on the subject is not in the least modified. We are glad to see that there appears to be a strong feeling in the country on the subject, elsewhere than in Liverpool, and we may particularly notice an admirably written letter in the *Standard* signed "J. H. M.," in which the author, writing from Leicester, complains that they have suffered in that town from the shortsighted policy of "cheap sites" and building churches in back places. He appropriately cites the example of the church at Montmartre, which owes half its effect to the commanding site on which it is situated, and whence it seems to dominate Paris. We may add that we hear great complaints that the leading Liverpool papers will print letters and statements in defence of the proposed site but refuse to give publication to anything written on the other side: we observed indeed that the *Liverpool Courier*, while printing Mr. Scott's letter in our columns, carefully avoided printing our comment on it.

The Preservation of Steelwork.

FOR the proper preservation of wrought iron or steel work it is not sufficient merely to cover the surface with paint, or even to imbed the metal in material believed to be air-proof or water-proof. All scale, rust, dirt, and moisture should be carefully removed as a precautionary measure. In some cases scale will ultimately fall away, leaving parts of the metal bare, and it always exercises a deteriorating effect, especially upon steel, for it consists of magnetic oxide, which is negative to steel and is therefore a fruitful cause of corrosion. Similarly, rust, dirt, and moisture must be removed, because the first of these will continue the process of oxidation, and the others will commence it in parts hitherto unaffected. In important engineering works it is generally stipulated that all foreign matter shall be removed from the metal before painting or similar treatment, but in building construction where steelwork is ordinarily hidden away so that deterioration can never be seen, special precautions are rarely taken. Scale, rust and dirt are often simply covered with paint, the steelwork is put in place, buried, and forgotten; or perhaps in a similar state, but without a coating of paint, it may be embedded in concrete. In either event, serious corrosion must ultimately ensue. Hitherto the removal of scale has been most frequently effected at a small cost by pickling in dilute acid, afterwards neutralising by lime-water, washing, and drying. More recently the sand-blast has been employed with considerable advantage. This ingenious apparatus has been much used for cleaning off scale, paint, and other substances from iron and steel ships before painting or repainting, and quite recently it was applied with great success to the ironwork of a station on the Manhattan Elevated Railroad in New York, for thoroughly scouring the metal surface before applying a new coat of paint for experimental purposes. The question of its employment for the preparatory treatment of structural steel work is well worthy the consideration of architects. But supposing the metal has been thoroughly cleaned and dried, it is by no means safe to assume that brickwork, masonry, or concrete will necessarily afford protection against corrosion. Vibration and climatic influences may cause fissures, affording access for air or moisture in all these materials, whilst brick and stone are permeable, and apt to retain moisture. Moreover, the process of partial decomposition results, especially in brickwork, in the formation of salts of corrosive tendency. Hence a coating of suitable paint or other material is very desirable for wrought iron or steel surrounded by brickwork or stone masonry. Portland cement concrete is undoubtedly the most efficient protection known, and there are many well-authenticated examples of its value. If properly made and applied, it should be so far air and water tight as to afford a really efficacious safeguard against corrosion, and preliminary painting will then be unnecessary. Some parts of the Niagara Suspension Bridge embedded in cement, when examined eighteen years after the completion of the structure, were found to be free from rust, and the original paint was still quite fresh. Again, some details of structural ironwork found embedded in mortar, and believed to have been so placed fully 500 years ago, were found to be in fair condition on being taken out. As the durability and safety of the modern building depends so much upon the preservation of the original strength of its steel members, it is greatly to be desired that the architect should consider for himself how this object may be best attained, and that he, as the person directly responsible, should delegate as little as possible to the manufacturer or the merchant, whose responsibility is of far more limited nature.

Engineering in Modern Buildings.

AN interesting discussion is now in progress by the American Society of Civil Engineers on the "Mechanical Installation in the Modern Office Building." A large office building of the present day exhibits many of the necessities of a city, but the engineering details must be suitable for an exceedingly dense population, and should provide for varied requirements of individual tenants if success is to be fully attained. Amongst the essentials there are several that are not properly met in this country. Heating is usually effected by an ordinary fire, for which the management insists upon providing fuel at excessive rates, and sometime refuses to allow alternative methods unless payment be made for coal that is not consumed. Even when a tenant is free to install hot-water heating apparatus at his own cost, there is rarely any available place for a boiler or any suitable route for the circulation pipes. Ventilation is rarely considered at all. The American practice of warming and ventilating an entire building upon a comprehensive system is infinitely to be preferred to the haphazard methods prevailing in this country, and its adoption ought to be beneficial to tenants and proprietors alike. Steam boilers would of course be required, and if utilised for the generation of electricity, additional advantages might be derived. Cold water supplies are already efficient for ordinary purposes, but hot water for lavatories seems to be regarded as a totally unnecessary detail, and lavatory basins in private offices are rarely if ever seen. Such requisites as these are always furnished in the American office building, to say nothing of the supply of cooled and filtered water for drinking purposes. Fire protection is another point in which our buildings are deficient. Electric alarms, chemical extinguishers, and hydrants are not particularly prominent features, and the theory that valuable papers and other property cannot be improved by a deluge of water does not seem to be very generally accepted. A system of extinguishing fires by chemical means would be infinitely preferable, or even the device practised on shipboard of filling the room with steam. These are some of the points that ought to be more fully considered by proprietors, and more emphasized by architects, for we are assured that intelligent enterprise in such directions would not be without its just reward.

German Electrical Work.

AT the Institution of Electrical Engineers this week the reports of the various committees appointed on the visit of the Institution to Germany last summer were discussed. Although nothing very novel appears in the reports, yet they will prove instructive to the electrician, as they emphasise the main points of difference between German and English practice. The elaborate design of the buildings, of some of the factories, and the large and clean engine-rooms seem to have impressed the committee. The two main systems of distribution employed are direct current and three-phase alternating. For transmitting power to a distance three-phase mains with direct-current distributing stations is the favourite solution. Accumulators are more largely employed than in this country. Accumulator cars are much used for electric traction in the centre of large towns, notably in Dusseldorf

and Berlin, but in Dresden Siemens' conduit system is employed. These systems are, of course, not as economical as the trolley wire, but they get rid of all the unsightly overhead work. One of the most noticeable features in all the works visited was the very large engineering staff employed. The average proportion was one engineer to every ten men. One reason of the large staff seems to be that very much greater care is given to experimental detail and general testing than in this country. Another is that the consulting engineer is practically non-existent in Germany, and so, much of the work that would be done by the consulting engineer in this country falls on the staff of the contracting firm. The use of the uninsulated middle wire in direct current systems of distribution seems to have struck the committee, but they apparently do not know whether to think it advantageous or not. We believe that its drawbacks more than counterbalance the slight saving in initial cost. With this system it is practically impossible to locate faults, and the waste of energy in leakage currents is often very heavy. The committee on telephones presented a very brief report. The only interesting points in it are that the telephone service in Berlin is discontinued when a thunderstorm is threatening, and that guard-nets, with a wide mesh about a foot square, are placed in some places as a protection against the possibility of a telegraph or telephone wire falling across the trolley-wire.

Brixton Prison.

IN last August was held the seventh and last sale of the materials of the military prison at Brixton-hill which is now being rebuilt. The former gaol had been erected as a convict prison. It was then converted for purposes of a military prison, with a capacity for 450 prisoners, but remained unoccupied during the past four years. The treadmill, invented by a Mr. Cubitt, of Lowestoft, and completed in 1821, was, it is said, one of the first set up in London. As recently as six years ago there were sixty-eight treadmills and cranks in operation in prisons under the jurisdiction of the Prisons Commissioners, but fifty of them have been discarded since in favour of more advantageous appliances. The new buildings at Brixton, covering an area exceeding seven acres, are intended for male prisoners who are remanded from the police-courts, and for those who, having been condemned to death, will suffer execution of sentence there when Newgate Prison has been pulled down. The plans include a hospital, a remodelling of the chapel with a gallery for Roman Catholic prisoners, waiting and consultation cells, and other modern improvements. The contractors are, we gather, Messrs. Drover, of Islington, who will finish the works in the course of the summer.

The School for the Indigent Blind.

THE new school buildings, upon a site of fifteen acres at Leatherhead, of which Princess Christian recently laid the memorial-stone, will replace the premises to be vacated in June this year at St. George's-circus, Southwark, which, with the site, have been purchased for 140,000*l.* by the Baker-street and Waterloo Railway Company for purposes of a generating station. The school was originally opened for fifteen inmates by four benevolent individuals in 1799, in what had been the notorious Dog and Duck tavern in St. George's Fields. Those premises being taken twelve years afterwards for the site of Bethlehem Hospital, the governing body bought a freehold site opposite the Brass Crosby Obelisk (1771), and there erected a new school for 112 patients. On April 25, 1834, Archbishop Howley, as President of the Charity, laid the first stone of the present buildings designed after the domestic Tudor style by John Newman, whose plans comprised an enlargement and a remodelling of the former premises so as to provide for a total of 220 inmates. The new buildings at Leatherhead, we read, will receive the same number for the present, and are designed by Mr. C. Pemberton Leach.

Excavations in the Holy Land.

FROM a recent number of *L'Illustrazione Italiana* we learn that excavations of importance are taking place at Sidon. They appear to be at the expense of the Turkish Government—under the direction of the Museum authorities in Constantinople, and the superintendent or foreman is an Italian. But for the present all particulars are wanting. Some photographic representations of the base of a huge monument supposed to be Phœnician are given in *L'Illustrazione*, and it is claimed that an ancient temple of great size and importance has been discovered.

The Society of Oil Painters.

THE exhibitions of this society are improving. The present one, now open at the gallery in Piccadilly, is one of the best we have seen. The President, Mr. Frank Walton, exhibits in the central room a landscape under the title of "All on a Morn in May" (210), remarkable for the exceedingly forcible manner in which a large tree is painted in the foreground, whose masses of foliage cover the greater part of the canvas, and the clear air and distance seen beyond it. Mr. Byam Shaw paints a puzzle for the visitors in "Time and Chance Happeneth to All Alike" (172), a quasi-mediæval riddle which we cannot profess to read; but it is clever to a degree in execution, and the figure on the right is charming. Near it hangs, as the opposite extreme of art, M. Fantin-Latour's "Andromède" (170), no new reading of the legend certainly, but a beautiful figure-study in his highly original style. Mr. Reid's various sea pictures show a curious and not always quite satisfactory treatment of the sea, but they are full of air and movement, "Home with the Catch" (140) being the most important. Mr. Melton Fisher (Vice-President) sends a charming half-length portrait of "Mrs. Melton Fisher" (137). Figure pictures are not the strong point of the exhibition, but Mr. Frank Dadd is very good in his semi-humorous subject, "A Round Table Conference" (117) where the heads of the three men are shown partially lit up by candle-light, and Mr. Dollman in "The Good Samaritan" (28), which is humorous or pathetic, in proportion as you are or are not a cyclist. Mr. Herman G. Herkomer's "Interior" (40) is an admirable drawing-room scene with two figures, full of character and all the details most conscientiously painted. Mr. Kennington produces an effective grouping of semi-nude figures under broken lights in his "Serena Found of Savages" (66), though those who know their "Faërie Queene" will hardly accept these clean and respectable savages for the half-bestial creatures imagined by Spenser. Mr. Henry Stock has produced a really remarkable fancy in his "Earthflower" (70), a plant with large leaves bearing a human head as the blossom; the whole very finely painted—one of the best things he has shown here. A new school of heavy, dark, and rather crude landscape is somewhat too much represented by various works not deficient in power but somewhat conventional in style and loaded in effect. There are other good landscapes in what we may call a healthier style; Mr. Tatton Winter's small work "Betwixt the Gloaming and the Mirk" (52), noteworthy for its real effect of evening light; Mr. Herbert Marshall's "London Bridge" (68), a more correct drawing of a Thames bridge, as might be expected, than we usually have from painters; Mr. Thorne Waite's "The Haywain" (120) and "The Mill Stream" (124); Mr. Peppercorn's "Dartmoor" (239); Mr. Orrock's "Holy Island Sands" (242); and Mr. John Collier's "A Devonshire Combe" (264), a beautiful landscape, and a kind of work that we never remember to have seen from this painter before. Miss Fortescue-Brickdale has a remarkable picture, "The Ugly Princess" (248), showing great power of colour; and Mr. Nettleship's "A Lone Wolf" (296) is quite in his best way as a piece of animal painting. There are a good many other works worth mention did our space permit.

The late Mr. John Brett, A.R.A.

THE announcement of the death of Mr. John Brett, which involves a great loss to English art, can hardly have come as a surprise to those who were aware of the state of his health for some time past. For the last two years it might have been noted that his large and striking sea-pieces were no longer prominent on the walls of the Royal Academy, and he was represented only by small works—some of them, however, of great beauty. Mr. Brett was a determined realist in landscape art, and with such a power of realism that his works went far to convert one to his creed. His picture called "Boulders," exhibited many years ago at the Academy, was one of the most remarkable examples ever seen of the pre-Raphaelite faith that everything in nature is interesting if you only paint it thoroughly down to the minutest detail. Later he took more decidedly to open sea pictures, always marked by the same force of realism and the same powerful effect of air and sunlight. His large painting, "Britannia's Realm," purchased by the Trustees of the Chantrey bequest ("rather humiliating," as he said when a friend congratulated him on the fact), when we first saw it on "private view" day, impressed us as if an actual vista out to sea had been caught between the crowd of visitors. He was conscious of his own powers, and during many years that he was an outsider and no good friend of the Academy, it was his boast that nevertheless "they dare not hang me badly." Mr. Brett was much interested in architecture, and influenced in some cases the decision of the Academy as to the subjects for architectural prizes; and he evinced his practical interest in it by twice over building his own house from his own plans—in each case a one-story house with

a special treatment. Socially and in conversation he was somewhat like the proverbial Ishmaelite—"his hand was against every man," and many are the witty and sarcastic criticisms on men and things which his friends (or sometimes his enemies) could recall. One of the best was in answer to a remark that a certain eminent art-critic was the greatest prig in London: "I should not put it that way," said Brett, mildly; "he is the greatest prig in the solar system; there cannot be another inhabited planet with another Mr. ——." Peace to his ashes! He said many "bitter words," but he had firm friends, and at all events he painted splendidly.

COMPETITION FOR NEW OFFICES FOR THE HEARTS OF OAK BENEFIT SOCIETY.

THE drawings submitted in this competition have been on view during this week at the present offices of the Society, Charlotte-street, Fitzroy-square. The competition must be characterised as one admirably conducted, under the guidance from the outset of the assessor, Mr. Sidney R. J. Smith, who drew up the conditions, answered the numerous queries, arranged the drawings, and made the award. Hence it is that with the drawings are hung up the Reports of the competitors, a custom which should be universally adopted, but is more generally neglected. Copies of the conditions and site plan, of the answers to queries, and even of the assessor's Report are also hung up for reference by visitors.

The number of competitors is small considering the importance of the building, twenty-two sets of drawings being all that have been submitted, but the quality of the designs is far above the average level of work in open competitions. The ruck of hopelessly inferior designs, which usually swells the number and lowers the average quality, is on this occasion absent.

The one flaw in the competition is that so frequently occurring: the promoters want too much for their money, and we agree with the assessor that no design submitted that is worthy of consideration for excellence of plan can be carried out for the 45,000*l.*, which was the suggested sum. Many of the competitors have wisely stated a reasonably fair estimate for their designs, and pointed out what curtailment of the scheme would be necessary if the expenditure must be limited to the sum named.

The site is a good one in the Euston-road, facing St. Pancras Church, and running through to Grafton-place in the rear, the only drawback being that it is somewhat pinched for light. Competitors had to bear in mind that the property on each side of that now to be built on belongs to the Society, but cannot at present be dealt with. They were, however, asked to design flanking elevations to the present scheme.

The problem set to the competitors was one in the solution of which few, if any, could have had much previous experience—the planning of offices for a business organised in many departments, and full of detail of an unusual nature, involving attention to some ten to twelve thousand letters and numerous callers every day. Added to this are a hall to seat about 300 delegates, a council-chamber for fifty members with committee-rooms, and necessary adjuncts, so that the problem was by no means easy.

The first premiated design, No. 17, is an admirable example of artistic planning combined with excellent working capabilities—symmetrical in disposition, effective in internal grouping, and convenient in arrangement; undoubtedly the best in plan amongst many that are good. The large public office is on the axial line, and with its surrounding offices, from which by glazed screens it is partly lighted, reaches to the Grafton-place front at the rear of the site. Further light is obtained by a large circular opening extending to the roof, which forms part of the effective grouping of the interior. The delegates' hall and the council-chamber are on the first floor, the committee-rooms on the second floor. Basement, third and fourth floors, and a mezzanine between part of ground and first floor, are occupied by the numerous departments and adjuncts of the working offices. The elevation is dignified in that phase of the Later Renaissance which the recent work of Mr. Belcher, Messrs. Gibson & Russell, Messrs. Lanchester, Stewart, & Rickards, and others has established as the mode of the moment in municipal buildings. The authors estimate the cost of their design at 48,601*l.*, which is certainly somewhat sanguine, and for which, as the assessor points out, the building could be carried out only by the strictest economy, not to say "cutting-down."

The second premiated design, No. 3, apparently owes its position chiefly to the small demand for light which it makes upon the property on each side. Although on quite different lines to the first premiated design, it falls but little short in convenience of working. The central feature on plan of the ground floor, the large public office, has a circular counter, within which are the officials and around which the public have ample space. The plan is distinctly economical, as, though priced at a much higher figure than the first, the cost is kept down to 46,048*l.* To do this, however, a vital error is committed, which we did not see referred to in the assessor's Report. The delegates' hall, 81 ft. 6 in. by 36 ft. 6 in., seating 300, is only 14 ft. high. The basement is somewhat meagrely lighted, so that the plan is by no means faultless. The elevation is somewhat florid and redundant in features, and suggests the Carlton Hotel type of treatment.

The third premiated design, No. 22, has, in the words of the assessor, "a good simple plan." The general office is, as in the first premiated design, on the central axial line with offices around, side-lighted and with top lanterns. The elevation is quiet and dignified, of a similar type to the first, the detail drawing being of easily recognised draughtsmanship. The authors' estimate is 44,966*l.*

The assessor especially commends the elevations of No. 2 and No. 5, and with that commendation no impartial critic can disagree. Both are by well-known and successful competition experts. The assessor prefers No. 2, but for ourselves we can find little difference in point of excellence. In plan we think No. 5 is slightly superior. Both have excellently designed halls for the delegates, but neither would be so smooth in working as the first premiated design in its office arrangement. The estimate of No. 2 is 45,000*l.*, that of No. 5 the same, but both estimates are, we think, over-sanguine.

In these five designs specifically mentioned by the assessor is the cream of the competition. The first premium has been awarded to the best plan, but none is absolutely perfect. The second premiated plan is original, and has many excellent points, but also some, in our opinion, serious faults.

Of the remaining seventeen designs it would hardly be fair to particularise any without speaking of all. If they must be placed in the second class to the first five, there is scarcely one that could be relegated to a third class. All that can be honestly said in disparagement is that some have elevations not equal in quality to their plans, and others plans that are not as good as their elevations.

CONCRETE AND BRICK CONSTRUCTION WITH CONTINUOUS INTERWOVEN METALLIC CORES.

BY H. E. P. COTTRELL, A.M.INST.C.E.

THE above description applies with a considerable amount of accuracy to a system of construction which has been steadily growing in favour with architects and engineers on the Continent, and has found its way across the Atlantic into the United States, but is very little known in England.

The Cottançin construction, as it is termed, consists essentially of the introduction into concrete and brick structures of a series of thin rods or bars which, starting from the foundations, are carried through walls and floors right up to and through the roof. These rods or bars are interwoven at suitable intervals on the plan of basket-work, so as to form a continuous whole throughout the building, the individual elements of which are so knitted on the one to the other, that they are constrained to act in concert. In this way local stresses in the various constituent parts of the building are dissipated by transmission and distribution to the remainder, and they eventually find their way to and are lost in the foundations. The building, being thus made to act as a whole, is necessarily less dependent, on the quality of the foundations and on redundancy of material in parts of the structure for its stability than buildings not so circumstanced, and considerable economies become possible. This is the practical reason why this form of construction has been steadily advancing in favour in France, where it first originated, and has spread thence further afield.

From the diagrams which accompany this paper the main characteristics of the continuous metallic core which is its basis may be readily gathered. Figs. 1 and 1A exemplify the essential difference between a woven and a non-woven core composed of rods or bars. The woven core may be pulled out of shape, but its solidarity cannot be destroyed except by actual cutting or fracture at more than one point; whereas the non-woven core, whose members are attached by independent wires at their intersections, can comparatively easily be destroyed by pulling out one member after another without any cutting or fracture.

Fig. 2 shows how the system is carried out in the construction of flooring joists, and how the horizontal rods which impart to these joists the required tensional strength, are interwoven so as to act in concert, and the attachments afforded for the coring of the concrete flooring which they support.

Fig. 3 shows the way in which an ordinary floor of concrete with a woven core is attached to the walls of the building and the woven coring which runs through them, and also exemplifies the way in which the joists are joined on to the flooring where joists are used. Fig. 4 shows the application of the same system to brickwork construction with hollow bricks having perforations. The interweaving process here is confined to the lines of departure of the cross walls, the floors, and the roof, the elements of the core running otherwise straight up, from the sill-bars in the bottom course of the foundations, vertically through the perforations of the bricks, which are laid in the ordinary fashion to break joint, from bottom to top of the building.

It will be noticed that with the Cottançin system of flooring construction, a reversion has been made to the old form of joist and board floors. This is still more noticeable in the type adopted in buildings of a domestic character where ceilings are provided. Here the ceilings are formed of plaster slabs used as shuttering, between the joists in forming the concrete flooring, after the joists are in place, and then lowered on to the projecting mouldings with which the under edges of the joists are finished off. The air space left between floor and ceiling forms a sound-proof diaphragm between the stories, which is much appreciated in buildings arranged almost universally as flats throughout the better part of Paris, and in other parts as tenements. This same air space is repeated in the superior class of buildings, not only in the floors, but in the walls and roof, making them fairly proof against changes of temperature, and in the case of the attics, really habitable, which, with the ordinary mansard-roof construction, cannot be said to be the case. The voids in the walls, floor, and roof afford ideal space for the accommodation of all the varied appliances connected with heating, ventilation, and lighting, the supply of water, as well as communication in the interior of the building and between the building itself and the various exchanges. The necessity for devoting such a considerable proportion of the interior space of each room to chimney breasts and flues is wholly done away with, as none of these need trench on that space when they are accommodated in the interior of the walls. According to the building regulations of the Municipality of Paris, builders had been long since prevented from using chimney breasts as piers for either stiffening the side walls of their buildings or supporting their floors. If chimney breasts have been continued to be built in Parisian houses for years past it has been almost wholly owing to the lingering popular prejudice in favour of the appearance of rooms provided with them and the impracticability, under ordinary conditions and with ordinary forms of construction, of providing the requisite accommodation for flues in the interior of the walls without unduly increasing their thickness.

The increasing demand for fireproof construction in buildings has doubtless led to the evolution of the many types in which a metallic core is inserted and built into the substance of the structure to specially provide for

a certain portion of the strains to which it is subjected, and to do away with and replace the suspiciously inflammable woodwork. The essential difference between these various types from this point of view lies entirely in the disposition of the metallic core with reference to the surfaces of the structure against which in case of fire the heat generated would have an opportunity of acting. In the Cottançin system the core is removed relatively so far from the surface that the heat has little or no chance of causing the destruction of the building by the disintegrating action of the progressive expansion of the metal and its sudden contraction resulting from contact with water. For moderate temperatures the co-efficient of expansion of Portland cement and steel are so closely similar that thin panels made on the above system, tested at the instance of the Ministry of Public Works in the laboratory of the School of the Ponts et Chaussées in Paris, by heating to from 194 deg. to 266 deg. Fahr. six successive times and then quenched suddenly in cold water, showed not the slightest crack or change of shape of any kind.

The increase of tensile strength imparted to concrete slabs by the addition of a woven core on the Cottançin system is exemplified by the following example:—Two identical slabs 3 ft. 3⅜ in. square were prepared, each 1¾ in. thick, one with a wire core, the other without. The first sustained a load of 2¾ tons, and gradually attained a camber of 1 7/16 before giving way, while the second gave way suddenly without sensible camber at a load of just over half-a-ton. Both the slabs were suitably supported free, and the experiment formed part of a series carried out by the military engineers, under instructions of the Ministry of War, in connexion with the proposed application of the system to fortifications. The Cottançin system in France and the French Colonies has been extensively applied to the construction of both open and covered reservoirs and tanks connected with sewage and waterworks, as well as filter-beds, water-towers (supports and tank having a continuous woven skeleton, and being practically cast in concrete), sewers, and drainage pipes, &c. The application to baths and washhouses built on the edge of rivers and watercourses entirely on made soil and river alluvium has been one of the most successful—these being floated, as it were, on the semi-fluid substratum.

The application of the system to caisson work, especially when under pressure, for bridge and wharf foundations, to weirs, to turbine chambers, to tunnel linings, &c., has been equally successful and economical. In foundations of the inverted box type, divided into cellular compartments, designed to replace sheet piling combined with ordinary piling necessary in the case of specially fluid subsoils, to permit buildings of any weight to be supported thereon, the success of the Cottançin system has been most conspicuous. The problem of rebuilding the modern town of Tunis, in the immediate neighbourhood of the harbour where the business quarter is situated, on ground below which the strata consists entirely of the silt of an ancient lagoon to a depth exceeding 100 ft., caused the local administration to carry out extensive experiments with all available systems of foundations. These experiments demonstrated that, whereas the ordinary foundations were incapable of supporting a surcharge exceeding 31·66 lbs. per square foot without irregular and serious subsidence, the cellular inverted box type constructed by the Cottançin Co. enabled the surcharge to be increased to 777 lbs. per square foot, with a uniform subsidence of only 0·08 of an inch. On increasing the surcharge to 1,711 lbs. to the square foot (over 17 per cent. in excess of the official maximum), the subsidence, which was still uniform, amounted to only 1 3/16 in.; the surcharge had to be increased to over 100 per cent. beyond the official maximum before any tendency to unequal subsidence was evinced.

A brief description of some of the more important works which have lately been carried out in accordance with the Cottançin system in France, and especially in Paris, will prove of interest. The factory of the International Society of Alimentation (Quay du Loire), occupying an area near the river, the ground being of a most unsatisfactory character, was lately erected on a partly sunken tank foundation—with double walls of hollow brick 2¾ in. in thickness and with double floors in concrete of the same thickness

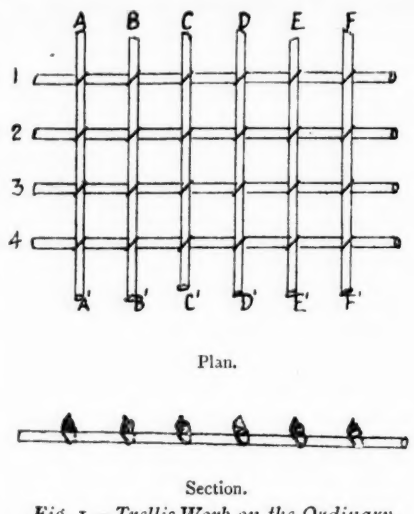


Fig. 1.—Trellis Work on the Ordinary System.

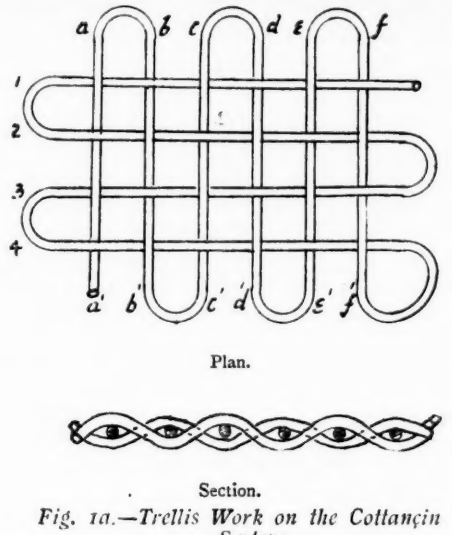


Fig. 1a.—Trellis Work on the Cottançin System.

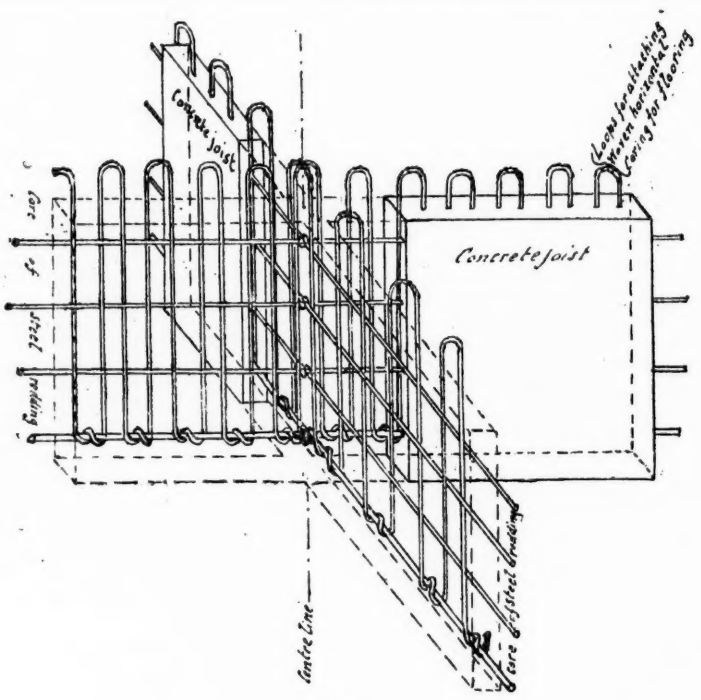


Fig. 2.

Intersection of two joists, showing arrangement of steel rodding forming the core for the cement concrete.

—the surcharge being calculated at 2½ tons per square metre (quarter of a ton to the square foot). These double walls and floors were carried out in connexion with the basement only, which is used for cold storage, save in the case of the bacon-curing house, which was carried up to three stories with walls 2¾ in. in thickness, the load on the foundation-bars (sills) of this structure being sixty tons.

The Schweitzer Biscuit Factory was lately constructed with a raised floor over the biscuit ovens to support a distributed load of one-tenth of a ton to the square foot. This floor is supported on piles of cored brickwork 8¾ in. by 15¾ in., with shoes of the inverted box type, also in cored brick, the raised floor projecting 4 ft. 10½ in. beyond the line of piles and constructed in cored concrete 2 in. in thickness with stiffening ribs. The elements of the coring were in this work unevenly distributed in accordance with the varying distribution of the stresses, and the openings for the oven flues were worked in like the buttonholes in a garment, and became in this way points of strength instead of weakness.

Rigaut's Oil Factory is an example where the distributed load is greater still for floorings no thicker than 2 in., the ribs or joists having in some cases as much as 40-ft. spans, and the distributed load, consisting in some cases of crushing mills, amounting to half-a-ton to the square foot. This factory was rebuilt on a cored concrete platform 2 in. in thickness, and consists of four stories; the brick walls and the internal brick pillars are all in cored bricks and of very slender construction.

The experiments carried out in connexion with these cored brick structures at the late Exhibition demonstrated that these perforated bricks (8¾ in. by 4⅜ in. by 2¾ in.) can resist safely compressive strains of thirteen tons to the square inch, while the steel core could stand tensile strains of ten times that amount. The great Paris Exhibition of 1900 furnished—as those who afforded the time to examine the buildings as well as their contents readily observed—a unique opportunity for experiments in every conceivable kind of construction—the Cottançin among many others. Two are worth mentioning as specially illustrating the economy of this style of construction and its adaptability to foundations for heavy machinery. The first was the official pavilion of the Republic of San Marino, erected adjacent to one of the legs of the Eiffel Tower. This was a three-story brick building surmounted by a cupola roof. The subsoil was the usual tipped rubbish ground of the Champ de Mars, and the foundations were of the inverted box type, the bottom being represented by the platform on which the building is built. The walls and foundations were entirely of cored brick 2¾ in. thick as well as the ribs of the cupola; the remainder of cored plaster slabs. There were no additional counterforts, and no iron or wood framing. The flat roof and the floors were in cored concrete 2 in. thick. The cost per cubic foot of enclosed space in the pavilion was only 1¾d. against an average of the other national pavilions, which, generally speaking, consisted chiefly of timber, laths and plaster, and were highly inflammable, of 19¼d. per cubic foot.

The other example was the cellular boxed-

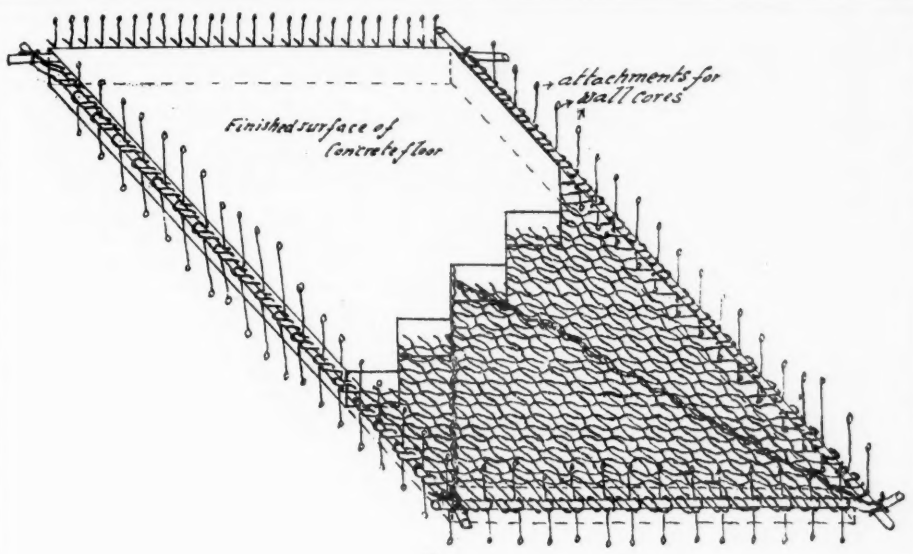


Fig. 3.

Concrete floor with core formed of steel webbing, showing method of attaching it to walls. The webbing is either woven in place or laid ready woven; or expanded metal may be used.

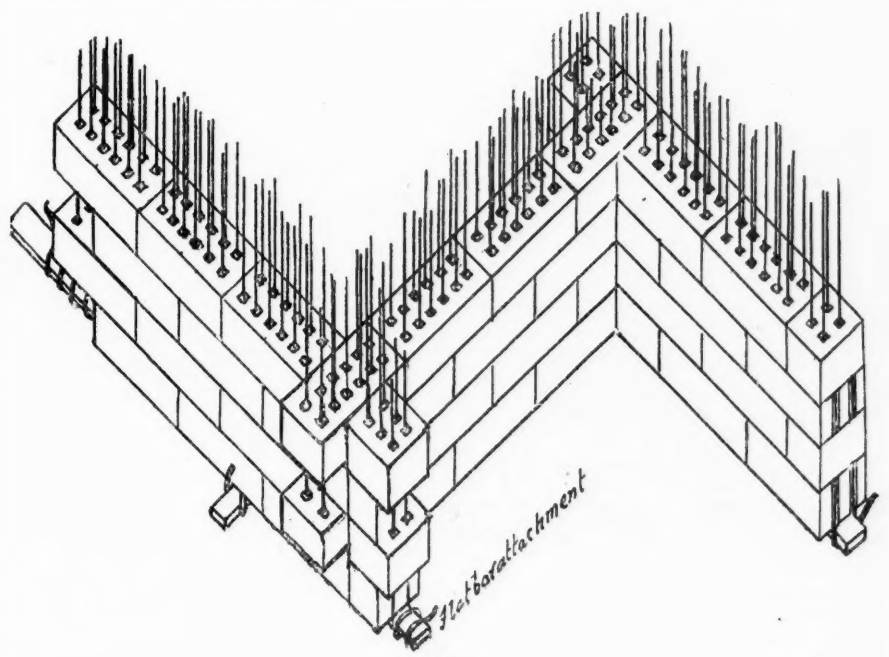


Fig. 4.

Perforated brick foundation with steel core, showing the Cottançin method of brick construction in single brick walls and partitions.

shaped foundations for the 500 h.-p. Cockerill gas engine in the Belgian section. These were carried down some 20 ft. into the same made ground, and the walls were all of cored brickwork, 2¾ in. in thickness, the cells being filled up with sand, so that each one acted as a sand pile. The stroke of the engine was equivalent to ¼ ton blow per every $\frac{1}{10}$th of a second when working. This inexpensive foundation stood in the most satisfactory manner, the little or no vibration communicated therefrom being specially remarked upon.

An important building work connected with the late Exhibition, though not of it, carried out to a large extent on the Cottançin system, were the huge blocks of hotel buildings (now used as flats) put up overlooking the footbridge across the Seine near the Trocadero in Passy. The upper stories and the mansard sides of the roofs are entirely in 2¾-in. cored brickwork—the flat roofs being in 2-in. cored concrete with 4-in. ribs to stiffen it—all the round lantern windows being formed without separate frames, the coring being worked round them basket fashion.

Another example of the adaptability of the Cottançin system to the somewhat difficult conditions of the Parisian Building Acts which prescribe a limiting radius for the outline of the structure of the roof in proportion to the building itself. The Hotel Ritz, on the Place Vendôme, has had the old roof taken down and a roof of the Cottançin type erected in its stead. By this means an extra habitable attic story has been added, which is a matter of considerable importance on a site costing over 60,000*l*. The walls dividing up these attic stories with the woven coring running through the whole take the place of the framework of the old roof. The walls are of cored bricks built to the curved mansard outline; the top is flat and of cored concrete, no lead or zinc is used for flashings or on the flat, the concrete being rendered in cement in lieu thereof. Walls and roof are constructed hollow, the inside being of cored plaster slabs used as temporary shuttering while putting in the concrete, and then dropped into position. Several important factories have been erected in various parts of Paris and the suburbs on similar lines to those previously described as well as many public and private buildings, such as the very remarkable seven-story produce-building in the Avenue Rapp, where the ceramic decorative panels of the façade are incorporated with the structure by means of the steel-woven coring instead of being simply overlaid.

A church only just completed at Montmartre, close to the Church of the Sacré Cœur, is in many respects the most extraordinary structure in Europe. This building, which is divided into an upper and lower church, the total height being 115 ft., has cored brick walls only 4½ in. thick, stiffened by counterforts 18 in. by 18 in. The floor dividing the two churches is of cored concrete 2 in. thick, stiffened by joists 14 in. by 4 in., with 40-ft. spans. The top is formed by flat domes with cored brick ribs projecting on the outside, the spaces being filled in with cored concrete 2 in. in thickness, while the voids are levelled up with coke breeze, and overlaid with a thin surface of cement rendering.

Many more interesting examples of the Cottançin type of construction could be given, of several of which the author has photographs and particulars before him and has also personally seen; but sufficient has probably been said to give a fair idea of an interesting and novel system which is not as well known on this side of the Channel as it merits to be.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

TWO IONIC CAPITALS IN THE BRITISH MUSEUM.

A MEETING of the Royal Institute of British Architects was held on Monday at No. 9, Conduit-street, Regent-street, W., Mr. John Slater, vice-President, occupying the chair.

The minutes having been taken as read,

Mr. Alexander Graham, hon. secretary, announced the decease of the following gentlemen:—H. E. Martineau, elected an Associate in 1851, and a Fellow in 1860; Hugh Leonard, honorary Associate, elected in 1878; and E. W. Smith, honorary Associate, elected in 1900.

The Chairman said it must be a matter of regret to them all to notice the recent sudden death of Mr. Smith, at a comparatively early age. Those who knew the work he did for the Archæological Survey of India must appreciate the loss which the Indian Government and others had sustained by the early decease of Mr. Smith.

Members attending for the first time since their election were introduced to the Chairman, including Mr. Arthur Clyne, President of the Aberdeen Society of Architects.

Mr. Alexander Graham announced the receipt of a large number of donations to the library. A list of them would appear in the next issue of the *Journal*, and he asked the meeting to accord a hearty vote of thanks to the donors.

This having been agreed to, the Chairman called on Dr. A. S. Murray to read a paper on "Two Ionic Capitals in the British Museum," of which the following is an abstract:—

In his opening remarks Dr. Murray said that Professor Meurer, of Rome, visiting the Museum some months ago, identified one of the Ionic capitals in the collection as from the Temple of Wingless Victory at Athens. It was an angle capital from the south-west angle, and was brought over by Lord Elgin, together with some slabs of the frieze. The temple had four Ionic capitals at each end—none along the sides; hence, probably, the later name of the temple, Wingless Victory. The official name was Athena Nikè, which was definitely confirmed some years ago by the finding of an inscription in the form of a public record ordering the building of the temple. The inscription is on marble, and states that the designs were to be left to Callicrates, whose name is familiar as one of the architects of the Parthenon. The date of the inscription is agreed to be not earlier than 450 B.C., but not much later—that is to say, about ten years before the completion of the Parthenon. It does not follow, however, that the work had been put in hand at once. There is another inscription added on the same slab obviously some years later, about 430 B.C. Accordingly, between these two dates, 450-430 B.C., the temple had been built. At the latest it is therefore older than the Erechtheum. In the Elgin Room at the Museum can now be studied an angle capital of the Erechtheum side by side with the newly-identified capital of Athena Nikè. The capital of the Erechtheum is exuberant in its beauty; the other is simplicity itself. The author went on to describe the capital of Athena Nikè, indicating various characteristics in the treatment of the ornament which go to prove its greater antiquity. There is in the museum a fragment of an angle capital of the Ionic order from the temple at Bassæ by Ictinus, the colleague of Callicrates in the building of the Parthenon. It would be satisfactory if the newly-identified capital could be claimed positively as the work of Callicrates. The Bassæ fragment, however, Dr. Murray considered both simpler and grander in its lines, and there was still the question whether the commission given to Callicrates about 450 B.C. for the Victory temple had ever been executed by him. Incidental reference was made by the author to a small terra-cotta capital, archaic Ionic, obtained

from Gela, in Sicily, two or three years ago, which bears traces of colours—red, white, and blue.

Coming to the second capital to be treated of, the author referred to the Ionic capital from the archaic temple of Diana at Ephesus, described in his paper on "The Sculptured Columns of the Temple of Diana at Ephesus," read at the Institute in 1895. To a large extent this was a reconstruction from fragments of the old burnt temple found under the later one, and fortunately those fragments were enough to enable the reconstruction to be made without recourse to much conjecture. But there remained over some other fragments of capitals from the same archaic temple. As they lay in the museum room they were almost unintelligible. After much doubting he (Dr. Murray) decided to take certain of them in hand. The author then described the fragments and the ornament upon them, and went on to show, by the aid of lantern slides, how they had been pieced together, the result being a restoration, fairly justified by the remains, of an archaic capital of an entirely new character. One particular feature the author did not think there was any other instance of among the remains of Greek architecture. A fragment of the rim presented on the outer face a double moulding with a sharp groove between. Into this groove had been pushed a thin strip of lead which first had been doubled back. The doubled edge is at the bottom of the groove; at the top the two edges of the lead are brought close together and hold in the manner of a vice a very fine thread of gold. Pliny mentions as still existing in his day at Cyzicus a shrine on which a fine gold thread had been inserted in all the joints of the marble, so that the interstices shone with the finest hair-like threads. Fragments from the capitals show that much red or vermilion had been employed on them. Some leaves show a white edging, others white with red edging.

There remain two fragments from the archaic temple at Ephesus which the author thought must also belong to a capital, though it is not yet clear how they are to be combined into one. One shows the head of an ox in very high relief, the other part of his back and haunch, with the tail thrown up over the haunch, as often seen in archaic Greek sculpture. There is in the museum a huge capital from Cyprus in which the heads and shoulders of two oxen were employed to support the abacus. The author concluded that if he was right in his assumption that these two fragments belonged to capitals, we have thus at least three types of capitals from one and the same archaic Ionic temple. We have also at least three types of bases, and, considering how few are the surviving fragments, no one can say but there may have been other varieties. Pliny says of the later temple that thirty-six of the columns were sculptured. The older temple also had sculptured columns. These enriched columns would be capable of carrying off some variety in the capitals. The moral is that if the architects of the Classical Revival in this country had been aware of the inventiveness of the early Greeks the aspect of our towns would have been very different.

The author concluded by acknowledging his indebtedness to the foreman of the masons and the well-trained men under him in the various restorations and rearrangements that had been made in the museum during the past fifteen years.

In addition to the lantern slides which Dr. Murray showed, some slides in illustration of the subject were shown and described by Mr. Hugh Stannus. Mr. Stannus said he thought that Dr. Murray had fully proved his case. The rosettes they had seen were something very different indeed from anything they had seen in Ionic work. In his opinion the Greeks were not so original as they were selective, and we could find, he thought, a prototype of all the forms they used; but the great charm of their work was that in their selections they kept the grain and threw away the chaff. Many of these columns were the gifts of different kings, and were probably different in design. When the Greeks came to make their perfect Ionic they threw away all the unnecessary features, and kept the best. He desired to move a hearty vote of thanks to Dr. Murray for his very interesting lecture.

Mr. R. Phené Spiers said that with regard to the capitals brought before them by Dr. Murray, particularly that from Ephesus with the rosette volutes, they may have noticed that what was called the egg and tongue, instead of projecting forward, receded at the top. It had long been his idea that the egg and tongue was not copied from the painted decoration on the echinus moulding of the Doric capital, but was altogether an original conception derived from the overhanging petals of a flower. The extremely interesting terra-cotta capital from Gela, in Sicily, clearly showed that. The egg and tongue as represented in the centre of the capital from Gela was a long pendent leaf. The capital which Dr. Murray restored some years ago showed to a certain extent the leaves falling back, and there was another capital close by it in the Museum, in which the leaves were carried at the top back underneath the volute-block. It seemed quite evident, looking at this capital and at the other examples, that the egg and tongue was really a representation of the ends of the petals of a flower hanging over. With regard to the capital from Bassæ, in the first publication by the Dilettanti Society no abacus whatever was shown, and in Blouet's work none was given. Looking through Professor Cockerell's drawings the other day, he noticed that in the first drawing the abacus was not indicated, but that in subsequent drawings he seemed to have tried to see how an abacus would come in. He should like to ask Dr. Murray whether there had ever been found any trace of an abacus, or whether it was evolved by Professor Cockerell in order to align with the abacus of the Corinthian capital which placed it in the centre. Professor Cockerell must evidently have felt that some more stable support was required, or he would not have indicated the abacus above it. One would like to hear Dr. Murray's opinion as to how the angle capital of the archaic temple at Ephesus was arranged. As the abacus of the Ionic capital of the Erechtheum was square there was no difficulty whatever; but when, as in the case of the early archaic capitals at Ephesus, the abacus was almost twice as long as its width, it became a very difficult question whether they did attempt at that time to form a canted angle. He had much pleasure in seconding the vote of thanks to Dr. Murray, not only for his paper, but for his long labour in connexion with these pieces of columns which he had put together and described.

Mr. Paul Waterhouse said he desired to ask a question which was an amplification of Mr. Spiers' question about the abacus of the cap with the rosettes. One always had a kind of impression that one of the main differences between Gothic and Classic architecture was that the Gothic architects got projections in their capitals, and that the Classicists did not, and consequently he did not understand the nature of that immense projection on the rosette cap which had been shown, and he would like Dr. Murray to state what the projection was from back to front as compared with the lateral projection—whether it projected forward to any considerable extent or whether it was practically on the same plane as the upper surface of the shaft. He noticed that both the abaci shown were fragmentary and were restored more or less conjecturally, and he would like to know whether Dr. Murray was absolutely certain about the length of the abacus in each case. If it could be proved that the abacus had such an exceptional length, it seemed to him that that would introduce a new element into our ideas and knowledge of classical architecture of a very radical character.

Professor Beresford Pite said would Dr. Murray add the date that he assigned, approximately, to the Temple at Ephesus to which this very interesting restoration applied, and at the same time indicate the relation of the capitals of this date to other known Ionic capitals? It seemed very important that they were able to connect the designer of the Temple of Nikè with the design of the Parthenon. Our conception of Greek work now included a refined and perfect Ionic as being the product of the same hand, the same mind, as the Parthenon, whereas the old idea was that the Parthenon was the refinement of a generation, the cream of a large quantity of work, and that the architecture represented by the Erechtheum and the Temple of Nikè belonged to a different school and chain of ideas. As to the inscription on the tablet referred to by Dr. Murray, which fixed the date and gave the name of the architect, though Dr. Murray indicated a missing link, he (the speaker) should like to take advantage of that and "jump" the conclusion that we have two very interesting illustrations of the work of a highly accomplished Greek architect who had also a share in the work of the Parthenon.

Mr. W. D. Caröe said they had a fair idea of the actual size of the capital from the Temple of Nikè, but not of the other two. Could Dr. Murray give them an idea of the dimensions of the terra-cotta capital and also of the one at Bassæ?

Mr. W. Brindley said the great lesson to be learnt from the illustrations they had seen was the individuality of the different men who executed the work in those early times. There were no set rules. There was as much freedom in early art as there had been in later periods under the different Gothic styles, whereas our Classic work was developed with scarcely any variation. Workers in art ought not to be tied. Throughout the length and breadth of Italy the artists of the Renaissance date worked with the same freedom that characterised early archaic work. It was always very agreeable to hear how Dr. Murray spoke of those who worked under him: he never took the credit to himself.

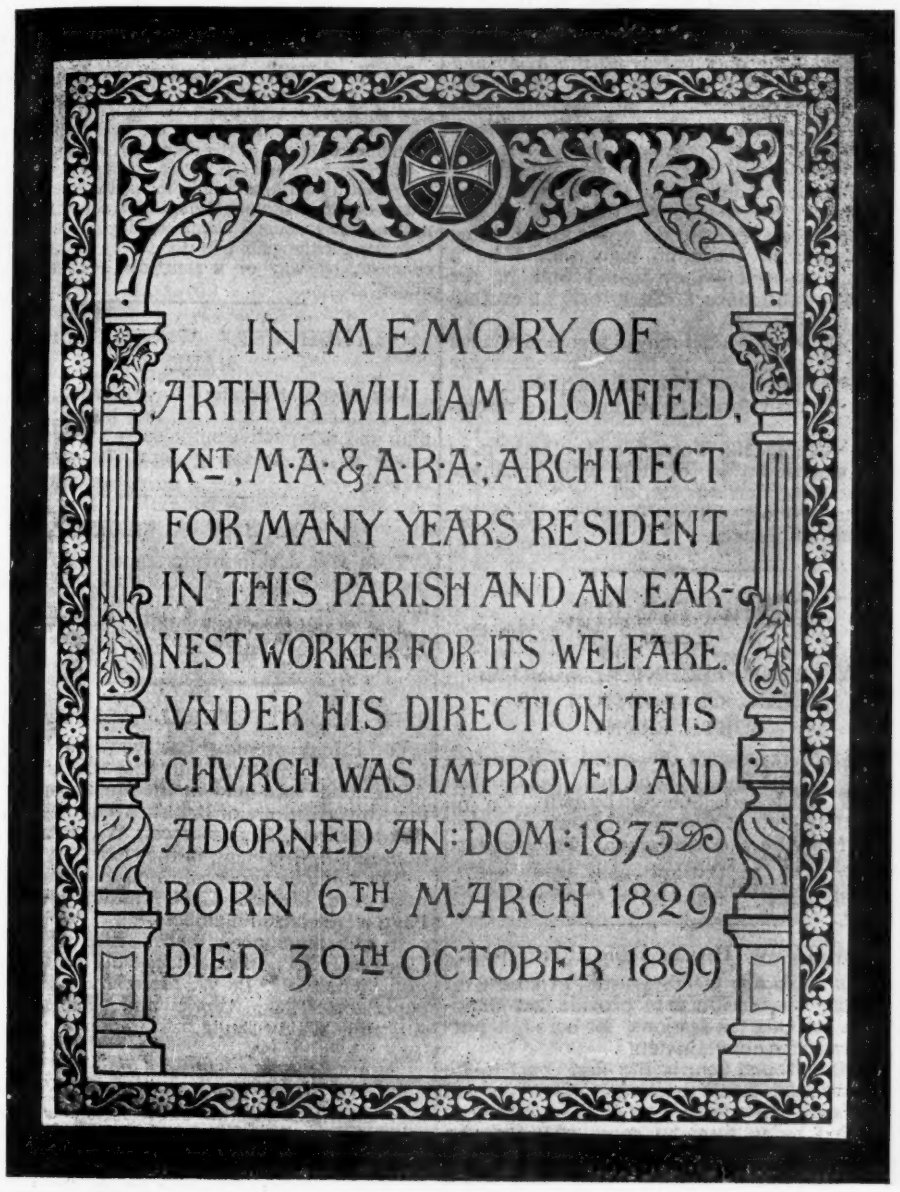
Mr. E. W. Hudson said he thought it would be a good thing if there could be prepared for the help of students a diagram or chronological list of recovered ancient Ionic capitals which would give an idea of the origin, and of the different steps by which the volute in its most perfect form had been arrived at.

The Chairman, in putting the vote of thanks, said it was certainly most interesting to find that a temple that in one's schooldays was always heard of as the Temple of Athena Nikè, or Wingless Victory, probably took its name not from Nikè, but from the form of the Temple itself. It was quite new to him, and very interesting. What must have struck those who had listened to Dr. Murray was the great pains and care required in attempting any restoration or reconstruction of a piece of work such as that which had been described. Dr. Murray told them how he had been fascinated by the fragments of materials he saw in the Museum, and it was evident that only by great patience and the exercise of much care was he able to reconstruct them and apply them as he had. The rosette capital which he had thrown upon the screen, showed, he understood, no sign of any connexion of the mouldings on the different sides of the capital. He presumed that no pieces had been found which would enable them to say whether there was any connexion between the mouldings on the different sides. With the vote of thanks to Dr. Murray he would include their thanks to Mr. Stannus for bringing his slides there and describing them.

The vote of thanks having been heartily agreed to,

Dr. Murray, in the course of his reply, said the chairman's question indicated a difficulty. They had only a piece of the moulding which ran above the eggs from one side to the other, but how it exactly impinged on the rim of the rosette they did not know nor how the bit under the abacus joined on to the rim of the rosette. The fragment which ran from rosette to rosette immediately above the egg moulding must join with the anthemion in the corner somehow, but how it would work out they did not know yet. As to the Ionic capital of Bassæ, he thought it was quite clear that there must have been an abacus. As to whether, among these archaic Ionic caps an angle volute had been found, he did not know; he did not think one ever had been found, but what had not been found to-day might be found to-morrow. As to the length of the abacus in the rosette capital, it certainly seemed to be excessive, but he thought they might be able to reduce it 2 in., but he did not suppose that would satisfy the architects. As to the projection, there was no question at all. It was on the same plane as the top of the shaft. As to the date, the date of the Temple was perfectly well assured. The columns of the Temple were the gift of Crœsus, and the time of his greatest prosperity was 560; that was the date of the Temple and the two caps. As to contemporary caps, they had a fragment from Samos which Cockerell found, he believed. As to the dimensions, the small terra-cotta cap was merely a model—a thing about 1 ft. in width, but in the new capital from Ephesus the spread from the outer edges of the rosette was 9 ft. 8 in., which was 3 in. in excess of the volutes of the former one and the shaft was certainly greater in diameter by 3 in.

The Chairman announced that the next


IN MEMORY OF
ARTHVR WILLIAM BLOMFIELD,
KNT, M·A· & A·R·A·, ARCHITECT
FOR MANY YEARS RESIDENT
IN THIS PARISH AND AN EAR-
NEST WORKER FOR ITS WELFARE.
VNDER HIS DIRECTION THIS
CHVRCH WAS IMPROVED AND
ADORNED AN: DOM: 1875
BORN 6TH MARCH 1829
DIED 30TH OCTOBER 1899

Memorial Brass to Sir Arthur Blomfield in St. Mary's Church, Bryanston-square.

meeting would be held on the 20th inst., when the award of prizes and studentships would be read, and Mr. Detmar J. Blow would read a paper on "The Architectural Discoveries of 1901 at Stonehenge."

The meeting then terminated.

ARCHITECTURAL SOCIETIES.

LIVERPOOL ARCHITECTURAL SOCIETY.—At the meeting of the Liverpool Architectural Society (Incorporated) held on Monday, January 6, the President, Professor Simpson referred to the death of Mr. Frederick W. Hornblower, who was for many years hon. secretary to the Society. The paper for the evening was read by Mr. James Parkinson on "Old English Cottages," with special reference to half timber work in the villages of Shropshire and Herefordshire. He pointed out how the lack of adequate tools influenced both construction and design, and showed how much of the best work in the district owed its origin to John Abell, architect and builder, appointed by Royal warrant chief carpenter to Charles II. On Abell's tombstone can still be read a pathetic appeal to

> "They who list and they who wist,
> For he can build no more."

During the paper numerous views, taken by Mr. Parkinson, were shown by a lantern. The legend selected for the Society's new seal is taken from Virgil (Æneid, ii., 15) and runs—

> —"Divinâ Palladis arte
> Ædificate."

CENTRAL LONDON RAILWAY LIFTS.—An English firm, Messrs. Waygood, have been commissioned to carry out some additional lifts required by the Central London Railway; a point worth noting, as the first collection of lifts for this railway were given to American firms.

MEMORIAL BRASS TO SIR ARTHUR BLOMFIELD.

A SMALL memorial brass, of which an illustration is here given, has just been fixed in the Church of St. Mary, Bryanston-square, to the memory of the late Sir Arthur Blomfield. It is erected, in this his parish church, by some of his fellow-workers in the parish, among whom his valuable help and personal charm will long be remembered. The church was reseated and decorated some twenty-five years ago under Sir Arthur's guidance, and has lately been further remodelled by his eldest son. The brass was designed by Mr. J. D. Crace and executed by Messrs. Hart, Son, & Peard.

ENGINEERING SOCIETIES.

INSTITUTION OF JUNIOR ENGINEERS.—At the meeting of this Institution, held on January 3, at the Westminster Palace Hotel, the Chairman, Mr. Percival Marshall, presiding, a paper on "The Utilisation of Exhaust Steam" was read by Mr. John Buley. In introducing the subject, the author criticised the several methods adopted with the view to disposing of the lime scale deposit on the tubes of evaporative condensers, and suggested that in many cases it would be feasible to overcome the difficulty by periodically circulating a dilute solution of hydrochloric acid over the fouled surfaces. Special attention was directed to the employment of exhaust steam for heating circulations, and for hot-water supplies for hospitals and asylums, and also its utlilisation by equivalent methods for raising the temperature of the water delivered to the ponds in public baths and wash-houses. An interesting illustration was given in which the exhaust steam from a 7½-in. by 6-in. duplex pump was utilised for heating the day-rooms of an asylum, where the cubical content was 54,864 ft.; with an external temperature of 37 deg. Fahr., with ample provision for ventilation, an internal mean temperature of 63 deg. Fahr. was maintained. Reference was made to the relative merits of direct heating, and inducing the flow of exhaust steam throughout a main circuit by means of an air-pump, as against the adoption of a central heater through which low-pressure water would have an accelerated circulation derived from an ordinary plunger pump. Where a complex system over a widespread area was a necessity, the latter system was advisable on the score of efficiency, first cost, and the general up-keep. Where exhaust steam was utilised for the concentration of liquors, the writer advocated the "Lille" system as the one from which perhaps the most favourable results had been obtained. With it an efficiency so high had been reached as to evaporate 40 lbs. of liquid per pound of coal. The direct return of condensation water to steam boilers was not commended, on account of the liability of intermittent shocks occurring. The writer considered that in practice trapping was the most satisfactory arrangement, and in spite of the disadvantages that sometimes attended the working of steam-traps, it was best to adopt this method of drainage, and to depend upon the condensation being returned to the boilers from a central hot-well, into which all the discharges should be led. The trap that relied for its action upon the concentration of the vapours of surplus heat was the one commended, rather than that on the expansion principle, by reason of the extreme fluctuations of pressure and consequent temperature where steam was employed in such a way as to bring about heavy spasmodic demands.

SANITARY INSPECTORS' ASSOCIATION.

AN extraordinary general meeting of the Sanitary Inspectors' Association was held on Saturday evening at Carpenters' Hall, London Wall, City. Sir James Crichton Browne presided, and was supported by Sir H. Gilzean Reid, the ex-President.

Sir James Crichton Browne, as President, contributed a New Year's address in which he said that their Association was increasing in numbers, improving in quality, and steadily rising in public estimation. It was, therefore, more potent in safeguarding the interests of its members and in advancing those beneficient objects and aims that it had persistently held in view. They could scarcely escape the influence of the Imperial ideal that was in the air, and if they were to attain to full strength and usefulness they must become a truly national society. They should receive into their pale all who were engaged in the work of sanitary inspection in every part of the kingdom, and while allowing to local branches a reasonable autonomy, should unify and co-ordinate these in a central authority. It was of great importance that they should perfect their organisation as soon as possible, because, if he read the signs of the times aright, a great sanitary upheaval — for which they should be prepared — are certain to occur very shortly. On all hands he saw signs of awakening on sanitary subjects. A somnolent public, hitherto only startled occasionally into a transient interest in health questions when some big epidemic wave swept across the land, was now permanently aroused to their significance. It began to realise what the sanitary reforms of the past, achieved in the face of so many difficulties, had done for it in the reduction of the death-rate; to grasp the truth that it was still grievously loaded with an altogether unnecessary burden of disease; and it began to bestir itself. And surely it was high time that public attention was concentrated on those preventable diseases, not yet prevented, which caused such widespread misery! London was again suffering from a visitation of smallpox, after practical freedom from it for a number of years. It was well calculated to create anxiety, for it had been creeping onwards week by week, and if the present epidemic pursued the usual course, it would reach its highest level between January and May. It was consolatory, however, to remember that never before had London possessed means at all approaching in adequacy to those it was now employing against the variolus invasion, and

never before had the whole country been so much on the alert, or so well prepared to resist its advances. During the prevalence of the epidemic in any locality the staff of sanitary inspectors should be increased, so that house-to-house visitation might take place. The precautions which devolved on the local authorities when notification had taken place and isolation had been effected, and in which they, as sanitary inspectors, were immediately interested, were of the usual kind, but should be carried out with special scrupulosity where smallpox was concerned. They consisted in free ventilation by open windows, in disinfection of rooms by formic-aldehyde vapour, in the burning of all soiled linen, in the saturation of sheets and garments in a strong corrosive sublimate solution, and in cases in which the eruption had appeared before notification had been made, in the smearing of the body with vaseline or olive oil before removal was undertaken.

He had spoken of smallpox on the suggestion of Mr. Tidman, their Secretary, putting aside for the present his own inclination, which was to discourse on the housing question—that most pressing of all the social problems of the day—or on a mere adjunct to it, the circum-housing question or the sanitary supervision of the curtilage of town dwellings, a topic deserving of serious examination. A number of years ago he made notes for a lecture on the back yards of London, but, like many other projected swift cruisers of his, that lecture was still on the slips; but none the less he felt sure that a careful study of the back yards of our towns and cities, and of the surface conditions of courts, alleys, and streets, would throw light on some social obscurities and help them in their sanitary campaign. The fronts of the houses in the mean streets of our working-class quarters, which, in their long drawn out squalid sameness, and in their endless repetition of door knockers and window blinds, where these existed, of exactly the same pattern, seemed to Ruskin, as seen in the south-eastern suburb of Bradford, the most frightful thing he had ever witnessed—suggested a dead level of wholesale indifference and imbecility—but the back yards of these same houses revealed a rich variety of human tastes, interest, predilections, and aspirations—individualism ranging from æsthetic refinement to hideous degradation. In the glimpses we obtained of them from the railway train as we passed from the centre through the suburbs of London, we observed in one a pretty and well-tended flower garden, in another a juvenile menagerie, and in still another a pile of pots-herds and debris. Over one floated the Union Jack from the top of a rigged mast, in another stood an oyster shell grotto, and in another was a measly grass patch bordered with pale-faced lettuces and sickly scarlet runners. Apart from these characteristics, he wished to draw their attention to the fact that in a very large proportion of these yards the ground enclosed was sodden and saturated with decaying organic matter. Our people were, on the whole, the most cleanly on the face of the earth, when they had a chance of being so; but still the ground of the backyards of their houses had, in many instances, become impregnated with organic refuse to an objectionable degree. The absence of the back yards marked the lowest point in insanitary habitations, as in those abominable back-to-back houses, of which Mr. Rowntree said there were still 1,396 in the city of York; and the next worst arrangement was the court, shared in common by a considerable number of houses built round it; unpaved, partly paved or cobbled, often full of holes, waterlogged, and reeking with filth. The backyard connoted emergence into a higher domiciliary sphere. It was a precious possession, the recreation ground of a family on a summer's evening, a breathing space, a field for the cultivation of hobbies, which should be jealously preserved; and therefore he was anxious that they should secure its wholesome condition, seeing, wherever they were entitled to do so, that it was paved or cemented for a certain distance from the dwelling, was kept swept and garnished, and was not sickened by an excess of excremental and waste matter thrown upon it, or converted into a cemetery by the interment of dead pets. For they as sanitary inspectors were the tutelar genii of the homes of the poor, and must include the backyards in their guardianship. In their anxious and arduous work they were sustained by the sights of the benefits immediately accruing from their labours, and by a vision of the greater good flowing from them that would be revealed hereafter. They were incessantly warring against two great curses of the age—dirt and pessimism—the one destroying the body and the other the soul. It was with dirt in its manifold epigenesis in these huddling days, in its nakedness unashamed, in its fantastic disguises, that they were primarily concerned; but in removing dirt they were lightening the discontent and despair that so often went with it. With sympathy, imagination, and worthy ideals before them—without some endowment of these no man should be a sanitary inspector—they would find in the faithful performance of their work an exceedingly great reward.

Sir H. Gilzean Reid moved a vote of thanks to the President for his timely and admirable address to the Association and the public.

Mr. Tidman formally seconded the resolution.

Mr. Grigg, Mr. Young, and others gave their experience in dealing with smallpox, and the resolution was carried.

After dealing with private business the meeting adjourned.

Illustrations.

LIVERPOOL TECHNICAL SCHOOL: DETAIL OF PORTION OF SOUTH FRONT.

THIS represents the detail of a portion of the fine building for the Liverpool Technical School, by Mr. E. W. Mountford, and is reproduced from a drawing made from the executed work. The sculpture is by Mr. F. W. Pomeroy. The drawing was exhibited at the last Royal Academy Exhibition.

NEW TOWN HALL, MARLBOROUGH.

THIS building, which is still in course of erection, was designed to provide accommodation for Quarter Sessions, for borough purposes, and for entertainments.

On the ground floor is the first court (to be used also for small meetings) and a council chamber. The greater part of the first floor is occupied by an assembly room, 76 ft. long by 37 ft. wide, furnished with movable fittings for a Sessions Court. The committee and retiring rooms are also on the same floor.

The basement provides cells for prisoners, heating-chamber, and a muniment-room, &c.

The elevations are of red brick, with Ham Hill stone dressings, and above the level of the first floor it is covered with rough-cast, the angles being accentuated by rusticated quoins. The roof will be covered with plain tiles.

The builder is Mr. B. Hillier, Marlborough, and Mr. A. A. Ellis is acting as clerk of works. The heating arrangements are being carried out by Messrs. Haden & Sons, Trowbridge.

The architect is Mr. C. E. Ponting, Marlborough, and the drawing was exhibited at the Royal Academy last year.

We regret that, owing to Mr. Ponting's absence from home, we have not been able to obtain from him a plan of the building in time for publication.

DESIGN FOR A TOWN HALL FOR A LONDON BOROUGH.

THIS design, by Mr. F. W. Newman, was one of the best of those sent in for the Royal Academy Gold Medal and Travelling Studentship in Architecture, the prize design for which we published last week. We believe this design ran the prize one pretty close, and in purely architectural treatment we are inclined to prefer it; the curved loggia on each side of the entrance is a very good idea; the very plain mass of wall above it and in the vestibule block is out of keeping with the rest of the design, though we know that it is a kind of point in fashion with the younger school of architectural designers at present. The internal areas for light are too small, though we observe that they are only used to light corridors and lavatories. But in the main this strikes us as a very pleasing and meritorious design.

The author sends us the following statement of his aim and intention in the design:—

"The conditions governing the design, required a 'Town Hall' for a London borough.

I had imagined the site to be on the borders of a London park, and in working out the design I had endeavoured to get, in the first place, a good hall, which would to a great extent govern the whole design, so that the building would not be mistaken for a block of municipal offices only.

The Town Hall is arranged on the ground floor, easy of access and egress, and separate from the municipal portion of the building, so that it could be used without disturbing the working of the council chamber or of the municipal offices.

The latter are arranged on the ground and second floors, with additional rooms in the basement. The whole of the first floor being used solely for committee-rooms, council chamber, Mayor's rooms, &c.

Access for the public to the gallery of the council chamber, by way of a staircase next to Rates office."

"LYNDHURST," WESTON-SUPER-MARE.

WE have not received any information from the architect in regard to this house; but the plan and perspective sufficiently explain themselves as far as the general design is concerned.

A COUNTRY RESIDENCE.

THIS is a design made some years ago by the architect, Mr. A. W. Cooksey, for a house for a site near Matlock, Derbyshire.

The drawing was exhibited in the Royal Academy Architecture Room in 1892.

THE ARCHITECTURAL ASSOCIATION.

ON Friday evening last week an ordinary fortnightly meeting of the Architectural Association was held in the Meeting-room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, W., Mr. W. H. Seth-Smith, President, in the chair.

The minutes and some nominations having been read, Messrs. A. D. Thacker and G. M. Page were elected members.

It was announced that a meeting of the Discussion Section would be held on the 10th inst., when Mr. P. W. Mulready will read a paper on "The Work and Influence of Augustus Welby Pugin."

New Premises Fund.

The Chairman then announced the following additions to the subscriptions received for the new premises, *i.e.*, Messrs. T. G. Jackson, 50*l.*; F. T. Baggallay, 31*l.* 10s.; A. Saxon Snell, 25*l.* 5s.; E. J. May, 21*l.*; R. A. Briggs, 12*l.* 12s.; S. Flint Clarkson, 10*l.* 10s.; H. J. Blanc, 10*l.*; G. B. Carvill, 5*l.* 5s.; C. Harston, 5*l.* 5s.; T. H. Russell, 5*l.* 5s.; E. Howley Sim, 5*l.* 5s.; B. H. Webb, 5*l.* 5s.; E. R. Chambers, 5*l.*; A. Hill, 5*l.*; H. S. Noblett, 5*l.*; A. H. Belcher, 3*l.* 3s.; W. Stewart, 3*l.* 3s.; W. L. Lucas, 2*l.*; C. M. Armstrong, 1*l.* 1s.; W. J. Devlin, 1*l.* 1s.; A. S. Taylor, 1*l.* 1s.; and J. T. Woodow, 1*l.* 1s. The total amount so far promised or received is 3,448*l.*

The Chairman said the response to the appeal on behalf of the Fund had, on the whole, been satisfactory. At a previous meeting he urged members not to be backward in giving small sums if they were not in a position to give large amounts. The Committee wanted to know that they had the sympathy of the members in the matter and to feel that the whole Association was with them in the enterprise; and the feeling of the members would, to some extent, be gauged by the donations. Members who were in a position to give small sums should not be discouraged by seeing in print large donations to the Fund; they should put down their names for what they felt they could afford. He might add that the Committee had not received all the money promised, but they were putting the money they did receive into a separate fund, and it was in no way mixed up with the general funds of the Association. The money received, which was earning interest all the time, was being kept absolutely distinct for the purpose of providing new premises for the Association.

The Day School.

The Chairman also announced that the Spring Term of the Day School would commence on the 13th inst. The school so far had been an absolute success, and those who were present at the closing meeting of the School, when some drawings by the students were shown by the headmaster, would have been delighted by the work already done in three months. Nothing could have been more satisfactory than the result of the work so far.

The Development of Domestic Architecture in England.

The Chairman, in calling on Mr. J. A. Gotch to read a paper on "The Development of Domestic Architecture in England from the Twelfth to the Eighteenth Century," illustrated by a large number of lantern views, said the Institute of Architects intended to help the Association to obtain a suitable sheet and another lantern, so that in future they would not be dependent on the oxy-hydrogen gas.

Mr. Gotch then read the following paper :—

The subject is large ; so large that one half of it has filled the four portly volumes of Messrs. Turner and Parker on the "Domestic Architecture of the Middle Ages," and as that work would take, on a moderate computation, four-and-twenty hours to read aloud to you, without any interval for rest or refreshment, it is quite obvious that the view which we take this evening of the subject must be cursory and confined to but a small part of the whole range of research.

It will be impossible to enter into minute details of style, decoration, and fittings, but it may be of interest to show, by means of plans and views, how the stately homes of England grew from their small beginnings, and what were the most important influences which affected their disposition and their appearance. We are accustomed to take the memorable houses of the country very much for granted, each one being characteristic of its own period. What I want to do is to show, if only by glimpses, how these great houses grew, and what relation they bear one to another.

In the present day we should classify the accommodation of a house in three main divisions : the reception-rooms, the bedrooms, and the kitchens or servants' quarters. Going back to the times of the early Georges, the same classification holds good, but the bedrooms were less important, and the reception-rooms much more so. Still further back, in Elizabeth's days, the same division is applicable, but we find the chief apartment among the reception-rooms to be the great hall. The bedrooms were largely left to take care of themselves. In all three periods the kitchen department is fairly commodious. But if we go back to the thirteenth or, further, to the twelfth century, the bedrooms practically disappear, and only the reception-rooms and the kitchens remain. Indeed, when we reach these primitive times it becomes necessary to alter our classification somewhat. There are still three kinds of rooms, but they consist of hall, solar, and kitchens, the solar being the private apartment of the master, or, to use a more appropriate word, the lord. These three rooms are the nucleus from which grew the vast mansions of Elizabeth and Anne ; and the development of domestic architecture consists largely of the development of this one single apartment for the lord into the separate apartments which are now provided for each of his household.

There is this initial difficulty in investigating the houses of the early Middle Ages—that most of them have disappeared. They were, as a rule, built of wood and plaster, only some of the more important being of durable materials. Those which have survived have suffered so many alterations in the course of their existence that their original arrangements are not always to be made out. Nevertheless, from such remains as survive, and from the rare references to such matters as have come down to us in contemporary writings, it is quite clear that houses consisted of, first and foremost, a hall, then at one end the solar or sollere (as it is also called), and at the other the kitchen with its subsidiary apartments. Writing about the year 1180, one Necham, who rose from being the master of the grammar school at St. Alban's to being Abbot of Cirencester, enumerates the apartments of a house as consisting of the hall, a private or bed chamber, the kitchen, larder, sewery, and cellar.

The houses of that time were comparatively limited in number. There were the King's houses, of which he had a good many in different parts of the country, the houses of the great barons, and the manor-houses. Besides these there were the great religious establishments, which, however, had their own special arrangements, hardly falling within the scope of this paper.

Many of the great barons lived in highly fortified houses, which we call castles, some of which were actually military strongholds. In the case of others it is not easy to draw a distinct line between the castle and the house, for they were all more or less fortified. But at present it is not the military strongholds which are under consideration, but those dwellings which were only fortified in order to secure their inhabitants. Such a house was the Peak Castle, in Derbyshire, which was built on a steep hillside on a triangular piece of land, protected on one side by one of the numerous and precipitous dales for which Derbyshire is famous, on a second side by the sheer descent of the gorge into which the Peak Cavern opens, and on the third by the steep hillside, at the top of which was the outer wall of the castle. The dwelling part of the castle was the keep or tower, the ruins of which still crown the summit of the isolated piece of land. This keep resembles the pele towers of the Scottish Border, many of which still remain both in Northumberland and in the Lowlands of Scotland. It is a square tower of three or four stories, each floor containing one room. The basement was a cellar ; the floor above it contained the hall ; over the hall was the lord's private apartment. This arrangement is very primitive, and represents what must have been the minimum in the way of accommodation which was tolerated. This vertical disposition of rooms, one over the other, soon gave way to a disposition which placed most of them on the ground floor, or if they were not on the ground floor they were spread out into a form less rigidly vertical.

Whatever arrangement was adopted, however, the hall was the chief apartment. It was the largest, the most permanent, and the most central. It was, in fact, the dwelling-place of the household and became synonymous with the house itself, which was in most parishes known as "The Hall." In this apartment the whole household lived, ate, and slept; all save the lord and, possibly, his family, who had a separate room into which they could retire, already mentioned as the solar. The solar appears to have been almost always an upper chamber, built over an apartment which was often used as a store place ; but there are so few remains of these very early houses that the exact arrangements can hardly be made out with certainty. The solar seems to have been approached in many cases by an outside staircase. But, at any rate, this much is clear, that the hall stood in the middle, between the solar and the kitchen, the latter being the third of the three main classes of rooms which these early houses contained. The cooking was not done in the hall, but in a separate building devoted to the purpose, attached to which were a few subsidiary rooms such as the larder, where the food was kept ; the sewery, where provisions, linen, and table furniture were stored ; the cellar, which was used for general stores and wine ; and the buttery, where the drink was distributed. These smaller rooms were not always provided; their presence depended on the importance and size of the house ; but there were always and in every house the three divisions of hall, solar, and kitchen, the hall lying between the other two. The arrangement of the hall was simple, and remained the same in principle from the earliest times down to the seventeenth century. It then underwent a change which marked a complete revolution in domestic architecture, and which will be described in due course.

The hall, lying, as already said, between the solar at the upper end and the kitchen at the lower, was entered, close to the latter, by a door in its side wall. Through the lower end wall were doors leading to the kitchen department, sometimes two, sometimes three. Of these, one opened into the buttery, one into the kitchen or kitchen passage, and the third (if there were a third) into the pantry. There was usually a screen stretching across the hall to keep off the draught from the open door, and more particularly to screen off the kitchen traffic, for draughts would still come through the windows, which were seldom glazed in early times. There were doors (generally two) through the screen into the hall itself, and there was a ceiling to the passage cut off by the screen, which formed a gallery usually known as the minstrel's gallery, although it is tolerably certain that very few of the ordinary households could have supported a private band. At the end of the hall, away from the screen, was the dais, which was a raised platform some few inches high, whereon the lord and his family and principal guests sat to dine. In this upper end of the hall was a doorway leading more or less directly into the solar. Both the solar and the kitchens were sometimes built of wood, as were also many of the subsidiary apartments. Such fragile buildings have disappeared, leaving in some cases little besides the hall to tell of the former extent of the house. This may have been the case at Oakham Castle, where the hall alone remains of the building erected about the year 1180 by Walkelin de Ferrers. But this hall is an extremely fine example of its kind ; it is of considerable width, and the roof is carried in three spans, one over a central nave, and the other two in the shape of a lean-to against it—an arrangement similar to that adopted in churches, and serving to remind us of the similarity of treatment adopted in both ecclesiastical and domestic buildings. The windows are small and low down, and they have, in common with the doorway, the characteristics that distinguish the transition from Norman to Early English. The interior might well be taken for that of a church, with nave and aisles, but the position of the doorways in the end walls, the treatment of the windows on the inside, as well as the absence of any indication of a chancel, would put the wary inquirer on his guard. The hall stands alone, the solar and kitchens—which must have existed—having disappeared. It may be that they were burnt, for accidents of that kind happened not infrequently. One, indeed, happened in 1182, two years after this hall at Oakham was built, to no less a person than Abbot Samson of Bury St. Edmunds, who, we are told, was nearly burnt to death in his solar, the only door being locked, and his Early English windows being too narrow to admit of his getting through them.

If not burnt down these rooms may have been blown down, as were the royal kitchens at Oxford in the seventeenth year of Henry III.

It seems quite clear from these and other specific references that many of the subsidiary rooms were built of wood, although the hall was of more durable materials. Its permanent character arose from the nature of its use. It was the sheltering place of the whole household. Temporary kitchens might be, and sometimes actually were erected, so might a temporary bedroom. But in the hall the family and its retainers ate and slept ; in it also the lord held his courts and received those who came to see him on matters of pleasure, of business, or of strife.

Personal comfort was not much studied in those days ; men were content to sleep where they could, and when there was no room in the hall they sought, without reluctance, the equally refined shelter of the stable. There was no indignity put upon Ivanhoe in sending him to the stable ; his fellow-knights often shared his fate in this respect. A little after his time we learn that Henry III. ordered the wood cellar at Clarendon to be fitted up as a chamber for the knights in attendance on him. As they were not particular about their beds, so also they had simpler views than we have about the heating of their rooms. In some houses only the solar had a fireplace, the hall was heated by a fire in its midst, the smoke finding its way out of a louvre on the roof. Here and there the hall had a fireplace of its own. The smoke from the central fire found other vents than the louvre, for but few of the windows were glazed ; wooden shutters served to keep out the weather. In some grand houses the part above the transome was glazed, while that below retained its shutters. But people were susceptible to draughts even in those hardy days, for Henry III. directed a window in the Queen's room in the Tower to be glazed, "so that the chamber might not be so windy."

It was in his reign, too, that the practice of wainscotting rooms—that is, lining the walls or the roof with wood—was introduced, and there are several instances in which he ordered a certain number of bays of a roof to be wainscotted, presumably in order to keep the draught from his own head and those of his principal guests.

But I must not enter too much into details : these matters have been mentioned rather with the view of showing how small an amount of what we call comfort was expected in those days, and how, therefore, it is not surprising

that very few rooms satisfied the domestic needs of the times.

At Stokesay, which was built in the thirteenth century, the main dispositions conform to the usual type. There is the large hall entered at the end of one of its sides. At its upper end is a door which eventually gave access to an outside staircase leading to the solar. At its lower end is a cellar, over which is an apartment with a fireplace. This room was reached by a staircase in the hall, standing in what would ordinarily be the screens. Of the kitchen there do not appear to be any remains. Beyond the upper end of the hall is a tower which was used for defensive purposes, upon the particulars of which it is not now needful to dwell. The details of the work are characteristic of the thirteenth century. The hall windows are of two pointed lights surmounted by a circle. The lights, which are divided horizontally by a transome, were provided with shutters, but the circle was apparently always open for the winds of heaven to blow through, and doubtless it was through them that most of the smoke from the central hearth escaped.

Yanwath or Yanwith Hall, in Westmorland, was built early in the fourteenth century, but underwent considerable alterations in the sixteenth. The same arrangement was adopted here as in the former examples. The great hall was approached through a passage, which was enclosed by a stone wall on both sides instead of having one side formed by the wood screen of the hall. On the left of the passage was the kitchen, on the right was the hall. The hall itself had a fireplace instead of a central hearth, and this fireplace was at the lower end of the hall. In later times it was more usually placed near the lord's end. There is also a bay window, a feature which became subsequently of universal adoption. The solar, in this instance, is developed into several rooms, situated in a tower, and exhibiting the usual characteristics of the accommodation of a pele tower, namely, one fair-sized room on each floor surrounded by thick walls, in which are contrived various diminutive apartments, access being obtained from floor to floor by means of a narrow newel staircase.

In addition to the usual accommodation which has hitherto been mentioned, Yanwath had a number of other rooms arranged so as to form an enclosed courtyard, one side of which has, however, disappeared. The entrance to this courtyard was through a gateway nearly opposite to the hall door. This courtyard idea, which arose from the necessity for defence, lingered on, as we shall see, for reasons of appearance, long after the need for defence had ceased.

At Sutton Courtney, in Berkshire, is a house, built about the middle of the fourteenth century, in which the usual disposition of rooms is again found. The hall is entered at one end through the screens, and the roof is made to agree with the framing of the screen itself. At the lower end is a doorway which led to the kitchens, at the upper end is a wing, which contained the solar on the first floor, reached by an external covered staircase. There is no bay window, but it is worthy of note that below the main window at the daïs end is a low side window, probably contrived for the pleasure of the occupants of the daïs. In later times, while the hall windows were almost invariably high up from the floor, the bay window of the daïs was equally invariably brought down low enough to afford an outlook. The lofty hall roof still remains (or remained when Turner and Parker wrote) and the general character of the work led to the hall being called the chapel, another illustration of the wide-spread, but fallacious, notion that Gothic forms must of necessity indicate a religious edifice.

The hall itself was usually a lofty building, with an open timbered roof. It divided the house into two separate halves, which, if they were of two stories, had to have their own separate staircases. The walls of the hall were often plastered, and for ornament they were hung with the spoils of the chase, or else with pikes, guns, and bows, with old swords and bucklers that had borne many shrewd blows. A good example is to be seen at Cothele, in Cornwall, and also at Haddon Hall, where the fifteenth-century wood screen still remains.

Haddon is a fine example of a large fifteenth century house built round two courts, and still exhibiting a considerable desire for defence. The hall, as was usual in double-courted houses, was placed in a wing between the two courts, thus being in the most central and best protected position. It was flanked, according to the usual custom, at one end by the buttery, pantry, and kitchen, and at the other by the family apartments, hitherto confined to the solar, but now developing into the parlour and other rooms, including a number of separate bedrooms. This plan of Haddon shows the great chamber and the long gallery, but it should be remembered that the Great Chamber was probably not so called prior to the sixteenth century, while the long gallery was contrived over the walls of a number of earlier rooms, towards the close of that century. The kitchens here are much more elaborate than in any of the previous examples, and they go to show that the wants of a large household and a hospitable lord were both great and permanent, and not so liable as in ancient days to interruption from hostile visitors.

The possibility of such interruptions was never absent from the minds of the builders of those days. Houses were nearly always surrounded by a moat where the nature of the ground permitted it. The entrance gateways still followed in many cases the ancient fashion of placing an archway between two towers. The courtyard plan still held the field in houses of any pretensions. As the years went on the character of the ornament changed just as it changed in churches. The tracery disappeared from the windows, which became flatheaded; doorways likewise became less aspiring, and assumed the obtuse angle of the Tudors. Fan tracery made its appearance in various places, such as the ceilings of bay windows and porches; circular stairs were placed in turrets, which were carried up above the main block of the building, and crowned with lead cupolas. The splendid brick chimneys of Henry VII. made their appearance, with all their intricacy of cut and moulded brickwork.

Then came the Italian influence, which first made itself felt in unimportant ornament, and then spread to shaping the building itself, reducing it to symmetry so far as the exterior was concerned, but leaving the interior still to be arranged after the old fashion.

It brought also that exotic feature, the loggia, or open arcade, which, however, never obtained a really firm footing in English houses. Indeed, all through the sixteenth century and the first quarter of the seventeenth, the new Italian influence never overmastered the old irregular English habits. But under the accomplished Inigo Jones, as we shall presently see, symmetry, which had hitherto been kept to the outside of the house, invaded the inside as well.

However much the character of the ornament may have varied, the character of the plan moved but slowly and always in one direction. Haddon and Apethorpe, two large houses, have shown how the old type grew at its two ends, the hall remaining as of old, but the kitchen and the private apartments undergoing considerable increase and development. On a smaller scale Canons Ashby tells the same story. So do the plans of Elizabeth's time, such as Cannons on a small scale and Kirby on a large scale, both taken from Thorpe's book. In looking at these plans it is obvious that the old idea is still the foundation of the arrangements, although in a great place like Kirby the accessory apartments have become vastly multiplied, and all thought of defence has been abandoned. Houses are no longer built for safety, but for show. Windows which once were sparingly introduced into the outside walls, that is, the walls looking out on to the country, are now used without restraint, and are regarded quite as much from the point of view of how they will help the composition of the design, as from that of usefulness in lighting the rooms. Cheerfulness, splendour, comfort (of a kind), these are the qualities now sought after. The hall had long ceased to be used as a sleeping apartment; when the family and servants retired to rest, it was left to Puck and the fairies, to Oberon and Titania and their train, who

> Through the house give glimmering light
> By the dead and drowsy fire.

It was not always used even as an eating place, at least by the master and mistress and their family, for many families had already sought a smaller and snugger room for their meals, where they could enjoy more comfort and privacy. Not only had the ancient solar developed into the parlour, but the parlour had been developed into the summer parlour, the winter parlour, and the dining parlour. It was no longer on the upper floors, but close to the hall on the ground floor. It was no longer the only bedroom, for bedrooms had been indefinitely multiplied, and, under the name of "lodging," fill up any space in old plans to which no more fitting name could be given. The solar had still further developed. In addition to the parlours on the ground floor, there had arisen the great chamber on the upper floor, and the long gallery—that feature peculiar to Elizabethan houses.

The finishing and embellishment of these rooms had developed along with their number. In the days of Henry III. we hear of plastered walls, and wainscotted walls and roof, but the rooms were extremely draughty, and the smoke from the central fires must have been almost intolerable; there was, indeed, no great inducement to abolish draughts so long as the smoke hung about the room. But the discomfort of draughts and smoke gradually told, even on the iron constitutions of mediæval knights, and by degrees fireplaces with a special flue for the smoke grew more common, and the smaller rooms were furnished with them. Draughts were excluded by filling the windows with glass, and later by plastering the ceilings as well as the walls. Indeed, the ceilings were plastered more frequently than the walls, which were usually covered either with tapestry or with pannelling. The plaster on the ceilings was not kept plain, as it usually is in our days, but was worked into an infinite variety of ornamental patterns. Indeed, by the period at which our story has now arrived, the fitting up of rooms had reached a point of development beyond which we have not gone very far. We have introduced a number of refinements in detail, but, with the exclusion of the weather, the furnishing of a means of heating, and the embellishment of the walls and ceiling, our ancestors of Elizabeth's time had really surmounted the chief difficulties of making an individual room pleasant. Its relation to the general scheme of the house is another matter.

Down to the end of the sixteenth century, and, indeed, as far as the first quarter of the seventeenth, the old type of house plan was still used—the old type which had prevailed in the days of the Norman kings. It is true that the ancient idea had been greatly developed; the kitchen department had been so much enlarged as sometimes to require a court to itself. The single private room, the solar, had been multiplied into several parlours, the great chamber, the long gallery, and many "lodgings" or bedrooms. But the hall still remained the centre of household life, and the daïs, which indicates its use as a living room, is shown on nearly all the plans in Thorpe's book. This enormous development of household convenience and comfort would, of course, have been impossible had the first idea of the builders been, as of old, to secure safety; but it was not, and as the certainty increased that a man need not depend upon his own efforts to preserve his security, but the public authorities, so he found more leisure to attend to his comfort, and for securing greater privacy for himself and the members of his household. The great hall began to feel the influence of this change; it had long ceased to be used as a sleeping apartment, and now it ceased to be used for meals. The family withdrew at one end, the servants at the other, and it became merely a vestibule. Concurrently with this change of use there went a change of idea in planning. The symmetrical disposition of houses which the Italian influence produced demanded that the hall should be central. Long-established custom demanded an entrance at one end of the hall, in the "screens," which, therefore, could not be in the centre of the façade. There are a number of examples, both in Thorpe's plans and in actual houses, of how these difficulties were surmounted. But when the hall was no longer wanted as a living room, there was no longer need for the entrance to be in its old position at the end, and the imperious demands of symmetry were satisfied by placing the hall in the centre of the façade and the entrance door in the centre of the hall. This point is curiouly illustrated by comparing Thorpe's plan of Aston Hall with that of the house as built. Thorpe shows the door in the old-fashioned situation at the end; it was actually built in the centre, and the hall here definitely ceased to be a living-room and

became a vestibule. This change is a momentous one, it brings us out of the mediæval idea into the modern.

But although at Aston the plan shows a new departure so far as the hall is concerned, it still follows the old lines in its general grouping, and so does the external appearance. The triumph of foreign fashions over native was, however, near at hand, and it was Inigo Jones who brought it about. At Raynham Hall the plan is no longer founded on the old type. The hall is not the chief apartment, with the family at one end and the servants at the other. The latter have descended into a basement, and the whole ground floor is occupied by family rooms. Traces of the old fashions remain in the projecting wings and in the gables with which they are roofed. But in Coleshill, another house of Inigo Jones, the foreign influence is even more marked, the plan is still more symmetrical, the elevations are still more Classic. In neither house are the windows mullioned: they have sashes, and the change from mullions to sashes marks the final disappearance of the last traces of Mediæval treatment.

The lesson in foreign fashions which Jones gave his countrymen were continued by Wren, and bettered by his successors in the eighteenth century. At Raynham and Coleshill one cannot help thinking that the snugness of home is sacrificed to the demands of stateliness; but at Blackheath and Keddlestone it is lost altogether, and the inhabitants of those great houses must daily pay a penalty inflicted by grandeur. The component parts of the house are divided into separate blocks with tiresome corridors of communication. The great houses of the eighteenth century make a brave show, but they exhibit a profound scorn for the small amenities of household life. They were built in an artificial age, and like the huge wigs which their builders wore as an indispensable part of their costume, they were intended rather for the admiration of the beholder than the comfort of the owner.

But the pursuit of comfort, which was the propelling force in all the changes of domestic architecture which we have been tracing, although it was neglected by the great in the days of Anne and the Georges, was still followed by persons of humbler ambitions, and in the smaller houses of the eighteenth century there is much that is admirable. Much skill and care was expended upon their internal embellishment, and the woodwork of that period is always worth our careful study. This is not the occasion upon which to enter on a minute description of the respects in which it differed from that of Elizabeth's time, this only need be said, that it followed the general tendency of domestic architecture in adopting largeness of scale and dropping minuteness of parts. The two examples from Wilton House and the Brewers' Hall will be sufficient to indicate the change of treatment.

This long story must now come to an end. It has not dwelt much on details, it has rather sought to show by means of actual illustrations, as distinguished from mere assertions, that our domestic architecture has undergone a real process of evolution, and that it has reflected, as indeed one might suppose that it would, the habits and wants of well-to-do English people. The feudal lord, surrounded by his retainers, was satisfied with one great room for his household, a small room for himself when he desired rest and privacy, and a place to cook his food; the more important added to these a chapel. These few rooms were securely placed behind a surrounding wall. The feudal lord's Elizabethan descendant was no longer concerned about the safety of his household. This had increased in number rather than diminished, and while the courtier of the Virgin Queen still kept the old hall of his forefathers, he added a vast array of rooms in one direction for his household, and in another for his great guests and their retinues. His descendant of Queen Anne's time no longer made even the pretence of living in the midst of his household. His servants were banished to a basement or a distant wing, and his chief concern was to have stately halls for the reception of his guests, after whose departure he and his family sought the seclusion of such rooms as were of a reasonable size. But just as these habits were of a slow growth, so the changes which they wrought in the houses were quite gradual. A continuous thread runs through the whole series from the Conqueror to the Georges, and the vast Palace of Blenheim can trace its origin back to the lonely little tower perched on the hill above the Peak Cavern at Castleton.

The Chairman, in inviting discussion, said it was not often that two important architectural works so dovetailed into one another as Mr. Gotch's book on the Renaissance and Mr. Blomfield's. Mr. Gotch developed the history of Renaissance from the Gothic in the most admirable way in his book, and Mr. Blomfield followed that up by his work on the later Renaissance, and the two works came together in a very apt way. He had asked Mr. Gotch how far his book had been read by the public, and he (the speaker) had been rather astonished that the sale, as far as Mr. Gotch knew, was less, in proportion, to architects than to the public, and that the public were really buying the book. Of course, such a book was most useful to architects, but it was very satisfactory to know that the public were buying it and were in that way taking an interest in architecture, and it was a happy presage of what was in store for architects, viz., an increasing interest in English architecture on the part of the public. One point about the lecture had been particularly interesting to him, and that was that wherever *necessity* dictated any particular form or planning it was very tenacious and change was very slow. From such a lecture they could realise how very gradual indeed was the disappearance of any particular feature in a plan. The hall of the house, for instance, persistently retained its form and position, in spite of its being most inconvenient as compared with a central vestibule, when the particular purpose for which the hall was first designed to fulfil no longer existed. A hall was really a most dignified entrance, and they all felt that unless they could provide a large vestibule for their house, dignity was sacrificed. But as regards ornament, that conservative tendency was not observable. Directly there was any knowledge of another style, that style was adopted, and from that time forth fashion seemed to rule in the smaller features and ornament.

Mr. J. Douglass Mathews said the paper had been a most interesting historical one, and Mr. Gotch had succeeded thoroughly in showing in an able manner the natural development from period to period. He desired to propose a hearty vote of thanks to him.

Mr. H. H. Statham, in seconding the vote of thanks, said it was difficult to discuss a paper which was mainly historical. When a lecturer submitted opinions, one could express agreement or disagreement with them, and give one's reasons for doing so, but in a historical survey all one could say was whether the facts were right or wrong, and, in the present instance, he did not question Mr. Gotch's facts at all. It was very interesting to have brought before them the origin of the modern English word the "hall"—"the Hall" of the big house, which was nearly out of use now, and which signified a large and sumptuous dwelling. It originally came, as they had seen, from this utilitarian one-room apartment in which the whole family lived, and it was a very curious thing to find the name surviving when the use of the thing was absolutely and entirely changed. It was one of those points which the study of any particular class of building brought out very often. There was one matter about which he was rather inclined to differ from what seemed to be Mr. Gotch's view as judged from the tone of his lecture. There was rather too much of a snub thrown upon people who built magnificent houses and received their friends in magnificent rooms reserved for the purpose; while they lived in small rooms themselves. That seemed rather a noble and chivalrous thing to do—to keep the fine part of the house for the reception of your friends now and then, sacrificing the pleasure of living in it yourself because it was too costly to keep up all the year round. It rather reminded him of the advice of a wise man, one of the seventeenth-century philosophers, he believed, to a young friend, *i.e.*, "Let your living be below your means, your dress up to your means, and let your residence be beyond your means, for it is your residence that your friends will judge you by." There was a certain amount of worldly wisdom in that.

Mr. Arnold Mitchell said Mr. Gotch had made many interesting allusions to the historical aspect of the question without entering into that too fully, and dwelt particularly upon that period of housework in which, perhaps, the greatest change took place, *i.e.*, in the time of Elizabeth. It seemed an interesting matter to try and arrive at the reason for the radical change which took place about that time. For the reason of that change he thought they should go back a little, and if they did they would find, in his opinion, that the change he referred to was due to the famous law which, though passed some time before, was not put into force until the reign of Henry VII., *i.e.*, the Law of Maintenance, which undoubtedly influenced, if it did not cause, the change. That law proscribed the keeping of more than a certain number of retainers, and as soon as it was enforced there was a change in house-building. The times were more peaceable, and houses which up to that time had been fortified with outside turrets became dwelling-houses in the true sense of the word, rather than semi-fortified places, and it was then that the change occurred in their outside appearance. One expression Mr. Gotch used in describing these Elizabethan houses was most suggestive, and that was "comfort of a kind." The idea of comfort entertained by people in those days was curiously different from the idea of to-day. Recently he had had the experience of staying for a time in an Elizabethan house finished about 1580-85, which practically remained unaltered from the time it was built. The sole means of reaching the bedrooms where guests would sleep was by crossing the great hall, or, on the first floor, by crossing the drawing-room immediately over it. In winter time, hot water needed by any one dressing for dinner had to be taken across the hall or across the drawing-room. A more inconvenient arrangement could not be imagined; the slops, even, had to be carried across the hall or across the drawing-room. This afforded an interesting sidelight upon the idea of comfort existing then; nowadays such arrangements could not possibly be put up with, but in those days they were evidently not considered discomforts. The arrangement for hot water in this particular house was very primitive: the sole means of providing it was by a little copper. Mr. Gotch alluded to the luxurious appearance given to the houses of the time of Elizabeth, and possibly before, in the oak wainscoting of the walls. But it was curious to notice how the builders a short time after counteracted in a measure the luxurious effect of the oak panelling. In the house he had been speaking about the whole of the oak panelling of the twenty bedrooms was painted and grained on the top of the genuine thing. By cleaning off this stuff the cause was found. The panelling which was at first a luxury, became no doub, a grievance, for it made the rooms dark and gloomy, and a coat of white paint was putt over it to add to the brightness of the rooms. The owners then resorted to graining, which had later became the fashion. It was, indeed, a pleasure to have the opportunity of cleaning off the paint, &c., and ot finding, as in this case, that the work was inlaid with bog oak and boxwood.

Mr. Guy M. Nicholson said, in reference to Mr. Statham's remarks as to reserving rooms for the entertainment of friends, it seemed to him that the modern way of doing that on a large scale was very much better, *i.e.*, to hire a town or other hall for the purpose. To live in a house, three-parts of which were not used except on one or two days in the year, seemed to be a most wasteful and unsatisfactory arrangement. He thought the paper was rather comforting in one respect, for it seemed to show that there had been an improvement by architects in the matter of plan, for one did not find houses built now with the wings difficult to reach one from the other, or the rooms one wanted close to the dining-room, for instance, the farthest from it. In one respect, perhaps, we might return to the old method of doing things. The open-air treatment of consumption might lead to doing without glass in the windows.

Mr. N. F. Barwell said the early history of these old houses and of castles was more a matter of archæological than of architectural interest, for there was not much that could be learnt from the study of them of a practical interest that could be applied to-day. It was impossible, for instance, to put our bedrooms in the thickness of the walls of the house. It was impossible to get modern accommodation and comfort in the old houses which had been referred to, nor did the owners desire it. As to cloisters, Mr. Gotch had said that the loggia never took firm hold in England, but he (the

speaker) thought that a good many people took pleasure and delight in such a feature. The outside turret staircase was sometimes a useful feature, for it was nice to have a little staircase which would lead up to one's bedroom or study without going through the house.

The vote of thanks was then put to the meeting and heartily agreed to.

Mr. Gotch, in reply, said, as to the desirability of keeping one set of rooms for entertainment, that was a matter of opinion. He was inclined to think that the Elizabethan noble could have entertained his guests with equal grandeur and pleasure in rooms which he occupied himself on other occasions. Still, of course, the fact was that the houses referred to represented the feelings and desires of the people of the time when they were built, and that was of considerable interest, for it showed that at various times various ideas prevailed, and the ideas of to-day were not held by the noble of the Elizabethan or Queen Anne days. As to cloisters and loggie, there again experience had shown that in many of these large houses the cloisters had been enclosed: that was really the point—however much we might think they were pleasant and agreeable, the experience of the owners was to the contrary, and they had been built in and thrown into the house as being more useful. His object had been to show the gradual development of the plan chiefly; the views were shown rather to illustrate how style developed in houses in the same way as in other buildings. The great interest in the subject was to show how the plan grew from very small beginnings in early times and gradually developed, but still maintained the same idea quite up to the time of Inigo Jones, when the great change took place from the mediæval to the classical idea.

The meeting then terminated.

The next meeting will be held on the 17th inst., when Mr. T. C. Cunnington will read a paper on "Architectural and Constructional Engineering."

TRADE CATALOGUES.

MESSRS. W. F. STANLEY & CO., of London, send us their catalogue of surveying and drawing instruments, the first issued since the conversion of the business into a Limited Liability Company. The catalogue includes particulars and illustrations of nearly all the instruments and auxiliaries required by the architect and engineer, and amongst them are several new forms of surveying instruments which have already been noticed in our columns. Messrs. Stanley have recently added a new building to their surveying instrument works, equipped with electrically driven tools adapted to shape much of the work out of the solid, to avoid screwing and soldering as far as possible. This is clearly a move in the right direction, as the number of separate parts can be considerably reduced, rendering instruments more accurate, as well as better able to stand hard wear. Another advantageous feature is that instruments so made will remain in adjustment for a much longer period of time.

Mr. Thos. W. Ward, of Albion Works, Sheffield, sends us a book on "Constructional Steel Work," which is more in the nature of a reference-book than a mere trade catalogue, and is one of several kindred publications that have appeared since we called attention to the highly unsatisfactory nature of most of the handbooks hitherto issued by steel manufacturers and merchants. Some preliminary notes given on the selection of girders ought to be found useful, but the explanatory matter relative to stanchions is rather too brief, and unfortunately includes no reference to non-axial loads. In the numerous tables showing the strength of girders, indication is given of the lengths beyond which excessive deflection will result. This is a convenient hint to users as to the line at which absolute strength ceases to be the governing factor in the selection of a beam. It is a pity that values are not given for the moment of inertia and the moment of resistance; and also that thickness and sectional area should be omitted from most of the tables. With one or two exceptions, none of the tables of columns contain the factors of safety employed, and there is no information as to the formula used for the calculations. Moreover, as a general rule, neither the thickness, sectional area, nor the radius of gyration is stated for the benefit of those desiring to make their own computations of strength. Consequently, this portion of the handbook is of very little practical use. Various simple types of roofs are illustrated in the next section, where there are also particulars of many useful roofing accessories. The remainder of the book is devoted to a very useful and well arranged selection of reference tables. Even in its present form the volume is a distinct advance upon the ordinary section book, and if the essential data now omitted were included it would leave very little to be desired.

Messrs. D. Bruce Peebles & Co. have sent us an illustrated catalogue of their gas burners, governors, and meters. Peebles's needle governor burners are too well known to require description in these columns. House governors of both the diaphragm and the mercurial form are illustrated and described. Small governors for incandescent gas lamps are also manufactured by this firm for use in residences and for street lamps.

Mr. Charles E. Schlimpert, of Colchester, sends us a catalogue of his "Reliance" donkey pumps, which are made on the interchangeable system, and the most ample information is given as to the dimensions and duty of each size. Towards the end of the pamphlet a useful table is found showing the contents of different sizes of pump buckets, and this table is followed by some simple rules by the aid of which any one can determine for himself the most suitable pump to meet any specified requirement.

BOOKS RECEIVED.

FORMAL GARDENS IN ENGLAND AND SCOTLAND. By H. Inigo Triggs. (B. T. Batsford.)

Correspondence.

To the Editor of THE BUILDER.

THE DIRECT EMPLOYMENT OF LABOUR.

SIR,—In my first letter on this subject I gave some views for and against direct employment, founded on personal experience and trustworthy evidence, and, in response to Mr. Chappell's request, I endeavoured to make them more clear to himself. But I have failed, and his letter of last week does not encourage me to persevere. Besides, your correspondent is fully entitled to differ from me, and, although one does not gather that he has had much experience in the direct employment of labour, by private persons or companies, advocates of direct employment will be no worse for his cautions. The "labour" question—*i.e.*, the question of the wages and conditions of labour—is large enough to form a subject by itself, and I am not disposed to go into it.

THOS. BLASHILL.

SIR,—Your readers have heard what the builder and architect have to say on this subject, and I venture to add the testimony of one who is in charge of a staff directly employed in the expenditure of 75,000*l.* per annum in the maintenance, improvement, and repair of 1,043 miles of roads, 300 bridges, and fifty-eight county buildings.

This is the growth of some thirty years, and cannot be compared to a private owner getting together a scratch crew for one building. My advice to such a one would be *Punch's* to those about to marry—"Don't."

There are certain works where the large amount of labour involved and the difficulty of estimating, causes loss either to owner or contractor. These are best done by direct employment of labour. I find there is a loss of ten to twenty per cent. on the labour over contract work and a saving on the materials of about twenty-five per cent, with the satisfaction of knowing you get the quality you intended. I cannot buy cheaper than a responsible builder—if as cheap; he is a constant customer to the merchant, I am intermittent.

Mr. Chappell has hit the mark in pointing out the difficulty of finding a capable manager. You cannot conceive the difficulty of getting such a man that can get together a scratch crew of good workmen. I have a painful remembrance of advising a client to employ workmen to alter and finish a house at Kensington. It nearly ruined me. In another case a client thought the estimate too high, and did it himself at a cost of 600*l.* above the builder's estimate.

Only last year a case was brought to my notice. The builder's estimate was considered too high; the architect was instructed to cut all the expensive work out of it, and do the work direct. A competent clerk of works of the architect's was engaged at 5*l.* 5*s.* weekly and expenses to superintend, purchase material, and pay wages. He had no experience of the purchase or prices of materials, and the cost of an inferior building was some 500*l.* to 600*l.* over the lowest tender.

With good supervision, if a builder's men make mistakes in work, he sets it right at his own cost. With direct employment it is very often allowed to remain, and every opportunity to save is taken advantage of, whereas the contractor is compelled to give the pound of flesh and a little more.

For public bodies and institutions able to keep a continuous staff, and for small, difficult, and intricate works requiring supervision, the direct employment of labour is economical, and I could give hundreds of instances of great savings equal to 50 per cent. in my own practice; but wherever a building can be brought into a bill of quantities, the contract system, with competent supervision, still holds the field.

ROBERT PHILLIPS,
County Surveyor for Gloucestershire.

P.S.—Let me thank you, as a reader of the *Builder* for fifty years, for the splendid No. 3074.

LIVERPOOL CATHEDRAL.

SIR,—Your editorial note on my letter in your last week's issue calls for one remark. What is said about the importance of "axial lines" and "vistas" is all on the principle of putting the whole of one's goods into the shop window. It is a principle which no doubt has its value, and is an especial favourite with French architects. It has never, however, been much adopted in England, and as regards our cathedrals it is conspicuous by its absence. In the great majority of cases—for instance, at York, Canterbury, Salisbury, Norwich, Lincoln, &c.—the cathedral is surrounded by its own "close," retired a little from the main line of traffic, a sort of harbour of refuge from the din and turmoil of the city. Our old cathedrals show themselves grandly from a distance, but within the town they do not assert themselves strongly till one gets into their own neighbourhood.

St. Paul's is, of course, a conspicuous example of the other idea, and one of great weight.

Which of the two is the best for a place like Liverpool I do not presume to determine, but each has clearly its advantages, and neither ought to be condemned simply because it is not the other.

J. OLDRID SCOTT.

SIR,—Mr. J. Oldrid Scott's defence of St. James's Mount site, leads one to surmise that he found it a more difficult task than he had supposed to report in favour of the Cathedral Committee's selection. His letter seems to require some further elucidation, but, even as it stands, it excellently supports the Petition Committee's opposition to the selected site; for it may be summed up as an attempt, not to disprove that Monument-place site is the best available site, but to prove that St. James's Mount site is not worse than that of Monument-place, excepting in regard to what Mr. Scott thinks the "great" and "serious defect" of "want of orientation" and "the narrowness of the site."

For the former, Mr. Scott says that "unhappily, there is no cure;" but the latter, he suggests, "could be remedied easily by encroaching some 40 ft. on the upper terraces of the cemetery." It should be remarked that the cemetery is some 40 ft. to 50 ft. below the intended site, so that the effect of Mr. Scott's suggested remedy may be fully realised; but, in any case, no such remedy seems to be contemplated by the Cathedral Committee, for there is no provision in the Cathedral Committee's Parliamentary Bill and Plan for such addition to the building site.

Mr. Scott's letter, written after he had "lately visited the two sites in question," and after he had been "told" certain things, as he states, makes one regret that he did not further enlarge his acquaintance with the whole subject before he expressed his views; for, had he gathered his information from more than one source, he would not, I feel sure, have questioned "the justice of the very strong objections" which you, Sir, who, I believe, know Liverpool well, see to the St. James's Mount site.

As I think that Mr. Scott may, perhaps, have been unaware of the circumstances of the case when he wrote his letter, I should be glad if you would permit me to ask him, through your columns, the following questions, which seem pertinent to his expression of views, and the replies to which may help to elucidate Mr. Scott's letter.

1. Whether Mr. Scott is aware that Archdeacon Madden, a member of the Cathedral Committee, stated in his speech at the Conference of the Liverpool (South) Rural Deanery upon the 20th ult., that "when the cathedral is built, the whole space round about the Cathedral will be open to the public?" And if, in the case of St. James's Mount site, it is not intended there should be "room on it for buildings other than the Cathedral itself," will Mr. Scott please explain why, in the case of Monument-place site, such provision would be "a point of some importance?" Also, whether it would not be equally possible to acquire additional building sites "other than" for "the Cathedral itself" in the vicinity of Monument-place as of St. James's Mount?

2. Whether Mr. Scott really imagines that "the

unceasing jangling of the car bells" of trams could be noticed from within a building of the massive construction necessary for a cathedral; and whether, as an experiment, he has ever noticed the "car bells" when he has been within, say, St. George's Hall, Liverpool, close beside which building the trams continually pass in rapid succession?

3. Whether Mr. Scott wishes to imply that "the petitioners seem to look on the jangling of the car bells as an advantage," and, if so, when and where did they do so? If, on the other hand, it is to the fact of Monument-place site being "surrounded by electric tram lines" Mr. Scott refers, will he please explain why an excellent tram service is "hardly an advantage which will be appreciated by those who have to make actual use of the Cathedral"?

4. When Mr. Scott expresses the opinion that "the site in itself is a particularly fine one, and one which any architect would take delight in dealing with," does he intend to speciously refer to "the site itself" only, and to ignore its geographical surroundings, to which reference has been several times made in your columns?

5. Does Mr. Scott seriously contend that to erect a cathedral upon an artificial "plateau some 15 ft. above the flanking road" (which latter would pass along the side of the building) "would give a splendid effect to the principal façade" if it only had an "open space about 500 ft. in depth leading up to it"? Would he also please state what area he would consider "ample room at the further end of the Mount for any further buildings which might be required," and what further buildings he had in mind when he made that statement? Whether, moreover, he, or Archdeacon Madden, correctly indicates the intentions of the Cathedral Committee regarding the purpose to which it is intended to put that portion of the site not required for the erection of "the Cathedral itself," as their respective statements in that regard differ?

6. Whether it is quite fair to, apparently, include the cemetery, which is some 40 ft. to 50 ft. below the site, as part of the latter, especially when it is remembered that by the Parliamentary plan it is so clearly not included?

7. Would Mr. Scott say why, if it "may be quite right in the case of a smaller town that all the great buildings should be grouped together as closely as possible," the same principle should not be applied, where possible, in the case of a large town; whether the object of such grouping is for the sake of "architectural interest" or for public convenience; and whether he does not think that the British Museum, for instance, would be more conveniently situated for the use of the general public were it less isolated from other public buildings in London?

8. If, in the case of St. James's Mount site, "the Cathedral would certainly, by degrees, form its own neighbourhood," is there any logical reason why there should not be the same result were Monument-place site adopted?

9. Would Mr. Scott name the authority who "told" him "that St. James's Mount is very little used"? Would he state the time of year, the day of the week, and the hour of the day when he "saw one young woman, one lad, two boys, and a policeman" using the gardens, and does Mr. Scott consider that a visit during one chance "hour" to the public gardens of a strange city enables him to form a reliable opinion as to the public appreciation thereof as public gardens and recreation grounds? And even were they never used as such, would that fact minimise their health-giving properties as mere open spaces?

Is Mr. Scott aware, moreover, that the St. James's Mount Gardens are the recreation grounds used by the adjacent School for the Blind; that they are largely used by the surrounding householders and by the general public; and that several meetings, attended by hundreds of persons, have been held at the St. James's Mount Gardens from time to time to protest against the proposed acquisition thereof by the Cathedral Committee for building purposes, instead of being continued for the purpose to which they were, some 130 years ago, dedicated for ever to the town?

10. Whether Mr. Scott knew when he formed his opinion upon the suitability, or otherwise, of St. James's Mount site, that test holes have been made, since the Cathedral Committee decided to adopt the site, to ascertain the depth at which a sound foundation could be obtained, and whether it is a fact that

No. 1 test hole is 22 ft. 9 in. deep below the site.
" 2 " " 18 ft. 0 in. " "
" 3 " " 40 ft. 0 in. " "
" 4 " " 33 ft. 6 in. " "

and whether he is of opinion that the walls of that side of the Cathedral which would face the cemetery would require to be carried down to about 40 ft. below the level of the site to ensure that they should rest upon a solid foundation?

11. Whether Mr. Scott has formed any estimate of the cost of foundation works, apart from the superstructure, which would be necessary to support a cathedral to be erected upon St. James's Mount site? If he has done so, would he please state his estimate of the amount and the basis of his calculation.

T. MYDDELTON SHALLCROSS,
Hon. Secretary, *pro tem.*, Liverpool
Cathedral Petition Committee.

SIR,—Having read Mr. Scott's remarks in last Saturday's *Builder*, I was very much astonished. Is he quite sure that, "after all, people's legs are the same length in Liverpool as they are in London"? The real question is, Why take the Mount away from the people? Mr. Scott says "that to the west, at least, they are of a mean order." He also says that "this site has a great defect in running north and south instead of east and west." If it is a fact that the Mount site is most central, and is very open, then it is precious to the working-men constituency. My contention is that the Cathedral Committee will rob the poor of a much-needed open space. Consequently the objections made by the meetings held on July 1 and 8 last at the foot of the Mount are of a much more serious character than the committee and Mr. Scott think. We addressed 900 on July 1, and more than 1,000 people on July 8 last. Those meetings were representative of the general community. The cloth was not in evidence at those Monday meetings; parsons did not count. It will not be a revelation to say that their Monday meetings can only be described as "packed" ones. Certainly they are not representative of the working men. Of the two sites in question I can see no objection to the Monument; it is not extremely noisy, but is most central. With reference to the site selected, I quite agree with you that "no French architect would pass over want of central vista as being no serious defect." We, the Anti-Mountites, have another plaint against the building on St. James's Mount—that of robbing the children of a playground. The Mount is not a howling and blighted wilderness, it is a pleasure-ground. The Cathedral Committee have not heard the last of the opposition yet. We are going to win. At the battle of the sites in the Liverpool Town Hall on June 17 last, I submitted an amendment in the form of a memorial from ratepayers in St. Domingo, Breckfield, Netherfield, and other wards, protesting against St. James's site.

THOMAS PRITCHARD.
63, Hamilton-road, Liverpool.

THE HAWICK LIBRARY COMPETITION.

SIR,—The generosity of Mr. Carnegie in presenting the Scottish boroughs with libraries is now being realised. Numerous competitions for the new buildings are in anticipation, and several have already been settled. Amongst these, that for Hawick deserves some notice, and I should like to direct your attention to the unfortunate way in which it has been conducted since it left the assessor's hands.

The conditions stated that an assessor was to be appointed, but that the committee did not bind themselves to accept his award. They took full advantage of this clause, but apparently were quite ignorant of their obligations, both to myself, as author of the first premiated design, and also to the rest of the competitors, for without informing them of the public exhibition of the drawings, or offering any explanation for their exceptional proceedings, an architect was chosen by themselves, not the slightest consideration was paid to the assessor's award, and I myself, the winner, was not even afforded an opportunity of meeting them to explain my scheme.

Such proceedings as this will not tend to encourage architects to enter competitions similarly advertised, and it is much to be regretted in view of numerous others of a like nature which are in anticipation.

S. D. ADSHEAD.

BAPTIST CHURCH HOUSE TENDERS.

SIR,—Mr. King is not in possession of all of the facts of this matter, and some explanation is due from me as architect of the building in question.

Tenders were to have been delivered on November 11, but in consequence of the illness of the quantity surveyor, the bills could not be ready in time for that date, and accordingly the opening of tenders was deferred until the 18th; this was the latest possible date for it, as the Committee's report had to be submitted on the 19th to the General Council, the members of which are summoned from all parts of the country, and unfortunately it was found, at the last moment, that the final three bills could not be ready even for that date.

The lowest tender received on the 18th was only 118*l.* below that of Messrs. Higgs & Hill, who were actually at work on the site and who had done about 4,000*l.* worth of work in foundations, &c., and I therefore told the committee that, in my judgment, it was a case in which the rule of accepting the lowest tender might fairly be departed from, and I strongly advised accepting Messrs. Higgs & Hill's tender without reference at all to the remaining estimates. They were very unwilling to go from the usual custom, and, after much discussion, they settled to leave the matter open until the tenders for the remaining trades were received, in the hope that Messrs. Higgs & Hill's final price might alter the position and so save them from doing what might be considered to be unfair. Five builders, all firms of the highest standing, gave tenders on the second lot of bills, and they would hardly have done so if they had felt the proceeding to be unfair to them. The time lost in changing builders would have been a very serious matter, and, as the usual stipulation that the lowest or any tender would not necessarily be accepted had been made, I think we should have been justified, under the circumstances, in giving Messrs. Higgs & Hill the contract in either case.

ARTHUR KEEN.

SIR WILLIAM CHAMBERS.

SIR,—In connexion with your article on the above subject, which appeared in the New Year number, I observe in one of your footnotes that you have been able to refer only to a third edition of the "Treatise," and so I beg to inform you that none of Chambers' references tending to disparage Greek architecture occur in the previous one. In the second edition the chapter in question is named "Of the Origin of Building," and the few sentences devoted to it deal merely, as the title suggests, with legendary matter more or less remotely connected with architecture, including the hazardous speculation of the origin of the Corinthian capital, which Chambers appears to have believed.

Criticism of Greek architecture is totally absent from the second edition, and, indeed, I fancy this is made fairly clear in the third edition itself, for in the closing sentences of the chapter on "The Origin *and Progress* of Building," Chambers says:—

"All that has been said respecting the superiority of Roman architecture was written a considerable time ago, when the Grecian had been extolled into repute: and structures were being erected in different parts of England after Attic designs. Fortunately, the sight of these first specimens excited no desires for more; after a few ineffectual struggles, the Roman manner obtained a complete victory. There seemed at that time no necessity to fight its cause, and these observations intended for the second edition were then suppressed. But latterly the 'Gusto Greco' has again ventured to peep forth and once more threaten an invasion. What, therefore, was omitted in the second edition it has been judged necessary to insert in this as a caution to stragglers."

This contemptuous criticism of the "first specimens" of Greek architecture most probably refers to the early work of James Stuart, who, in 1760, designed the front and some of the interiors of St. James' Place, and as Stuart in his "Critical Observations of the Buildings and Improvements of London" (published in 1771) makes reference to his own design for Lichfield House (No. 15, St. James-square), I think it may also be included among them. The fact that "Grecian had been extolled into repute" is, of course, obvious, since we know that Le Roy's—"Les Plus Beaux Monuments de la Grece" was published in Paris in 1758, and that "Stuart and Revett" first appeared in 1762. These facts prove that Chambers, in addition to having viewed actual modern Greek buildings, had had (prior to 1768) ample opportunity to see "good and reliable drawings" of Greek work, as far as such could be obtained at that period.

Under these circumstances then, and for additional reasons, I venture to take the liberty of questioning the accuracy of your statement that Chambers, while uttering his opinion on the merits of Greek architecture, was "speaking entirely in the dark," though I agree that he had an evident desire to make the least of them That part of the paragraph which you quote no doubt supports the theory, but if it be continued to the end a very different view presents itself. After discussing the deficiency in constructive skill—"such as their gouty columns, their narrow intercolumniations, their disproportionate architraves, their hypæthral temples which they knew not how to cover," he continues:—

"And their temples with a range of columns running in the centres to support the roof, contrary to every rule of beauty or convenience."

Now I think it would be impossible for any man to invent such an elaborate and particular criticism—more especially as the state of affairs described has an actual existence.

In the temple at Pæstum, which is called the Basilica, there are sixteen columns on each flank and nine on each front. In addition to this peculiarity, the central columns on either front are joined by a colonnade which supported the roof. A plan and perspective of this may be seen in "L'Architecture Grecque," by V. Laloux (page 184 *et seq.*) and in Messrs. Murray & Sons' guide to "Southern Italy and Sicily" (page 178 *et seq.*) there are these dimensions:—

Total height of column 21 ft.
Diameter at base 4 ft. 9 in.,

while a note states that the shaft from top to bottom is in one continuous curve. From the dimensions which are supplied I find the intercolumniation is exactly equal to the lower diameter.

Of course we know that Chambers never visited Greece, but his tour in Italy was for upwards of two years, and so I believe that the evidence proves that he either visited the Greek temples at Pæstum *in situ*, or else had seen an accurate drawing of the Basilica, and had it in mind when he wrote the passage I have quoted.

That his critical judgment may have been unjustly biassed is quite another matter.

MACLAREN ROSS.

*** Mr. Ross's information as to the first edition of the "Treatise" confirms the suggestion we had already made, that some of the remarks in the third

edition were prompted by the appearance of Stuart's book. What he says as to Pæstum seems probable; but then we should deny that any one who had seen the Pæstum remains *only* had, in the true sense of the words, seen "Greek architecture." It is a long step from Pæstum to the Parthenon.—ED.

MR. BREWER'S DRAWINGS OF OLD LONDON.

SIR,—I should be very much obliged if one of your readers could lend me for a few days the reproductions of Mr. Brewer's drawings of mediæval London which appeared in the *Builder* at various dates between 1884 and 1888. As they are out of print I cannot get them from your office.

I will take great care of them, pay postage both ways, and return them promptly.

The ones I want particularly are those of:—Westminster Hall and its Surroundings, November 15, 1884; Westminster Hall; Old London Bridge, May 10, 1884; Tower Hill, January 7, 1888; Smithfield, Clerkenwell, Southwark, dates unknown to me; but I should be very glad to see the whole set.

D. BEDE CAMM, O.S.B.

Erdington Abbey, Birmingham.

The Student's Column.

DRAINAGE AND PRIVATE SEWAGE-DISPOSAL.

CHAPTER 2.—THE LAW IN ENGLAND AND WALES, EXCEPT LONDON *(continued)*.

DRAINAGE RIGHTS (3).—If a sewage conduit is not a drain, it must, according to the definition given in the Public Health Act, 1875, be a sewer, but it is not every sewer into which a building owner has the right of connecting his drain. By Section 13, all existing and future sewers within the district of a local authority shall vest in and be under the control of that authority, except:

"1. Sewers made by any person for his own profit, or by any company for the profit of the shareholders; and

"2. Sewers made and used for the purpose of draining, preserving, or improving land under any local or private Act of Parliament, or for the purpose of irrigating land; and

"3. Sewers under the authority of any commissioners of sewers appointed by the Crown."

Sewers within the district of one local authority may also vest in and be under the control of another local authority. Again, by the definition of the word "sewer" which has already been quoted, the drains of county roads are not sewers.

The sewers to which drains may of right be connected (on conditions to be now stated) are those vested in a local authority, whether this authority be that of the district in which the sewers are laid or of another district.

By Section 21: "The owner or occupier of any premises within the district of a local authority shall be entitled to cause his drains to empty into the sewers of that authority on condition of his giving such notice as may be required by that authority of his intention so to do, and of complying with the regulations of that authority in respect of the mode in which the communications between such drains and sewers are to be made, and subject to the control of any person who may be appointed by that authority to superintend the making of such communications." Failure to comply with these provisions may involve a penalty not exceeding twenty pounds and the closing of the communication.

The owner or occupier of premises within a district has therefore the right of connecting his drains to the sewers vested in the Local Authority of that district, provided that he fulfils certain conditions; but, of course, in order to make such connexion he may not trespass over another person's property or commit a nuisance. Note that, according to the definition in Section 4, the word "premises" includes "messuages, buildings, lands, easements, and hereditaments of any tenure," and that the work must be carried out in accordance with the Authority's "regulations" (not "by-laws"). According to Lumley, the regulations are at the entire discretion of the Local Authority, but the regulations contemplated appear to be general regulations applicable to all cases in the district. In the case of Baxter *v.* Mayor, &c., of Bedford, Mr. Justice Cave decided that the sanitary authority was justified in cutting off the connexion between a house-drain and a sewer, because the owner of the house had not given the two days' notice of his intention to make the drains which the authority's by-laws demanded.

Section 22 gives the owner or occupier of any premises "*without* the district of a Local Authority" the right to "cause any sewer or drain from such premises to communicate with any sewer of the Local Authority on such terms and conditions as may be agreed on between such owner or occupier and such Local Authority, or as, in case of dispute, may be settled, at the option of the owner or occupier, by a Court of Summary Jurisdiction or by arbitration in manner provided by this Act."

The terms and conditions will probably include a monetary payment and compliance with the regulations of what may be termed the foreign Local Authority.

These two Sections (21 and 22) confer important drainage rights on the owners and occupiers of premises. These rights are, however, modified by Sections 16 and 17 of the Public Health Acts Amendment Act, 1890. These sections are among those which may be adopted by both Rural and Urban Local Authorities. Section 16 declares it illegal for any person to suffer to pass into any sewer of a Local Authority, or into any drain communicating therewith, "any matter or substance by which the free flow of the sewage or surface or storm water may be interfered with, or by which any such sewer or drain may be injured." The person committing such offence is liable to a penalty not exceeding ten pounds and a daily penalty not exceeding twenty shillings. Section 17 prohibits the discharge into sewers, or into drains communicating therewith, of

"(*a*) Any chemical refuse, or

"(*b*) Any waste steam, condensing water, heating water, or other liquid (such water or other liquid being of a higher temperature than 110 deg. of Fahrenheit), which, either alone or in combination with the sewage, causes a nuisance or is dangerous or injurious to health."

The maximum penalty for an offence, after seven days' notice has been given by the Local Authority, is 10*l.*, and the maximum continuing penalty 5*l.* per day. By Sub-Section 2 the Local Authority is empowered to enter premises for the purpose of ascertaining whether the provisions of Section 17 are being contravened.

Section 18 of the P. H. A. Amendment Act, 1890, may also be adopted by Rural as well as Urban Authorities, and empowers the owner or occupier of premises to cause the Local Authority to make the communication between "any sewer or drain from those premises" and the Local Authority's sewer. The cost of the work must be estimated by the Surveyor of the Local Authority, or, in case of dispute, by a Court of Summary Jurisdiction (if the estimate is under 50*l.*), and by arbitration (if the estimate is above this amount). The estimated cost must be paid by the owner or occupier before the work is commenced.

4. *Drainage Duties and Responsibilities.*—The most important sections of the Public Health Act (1875) dealing with the duties and responsibilities of building-owners in regard to drainage are Sections 23 to 25:—

"Section 23.—Where any house within the district of a Local Authority is without a drain sufficient for effectual drainage, the Local Authority shall, by written notice, require the owner or occupier of such house, within a reasonable time therein specified, to make a covered drain or drains emptying into any sewer which the Local Authority are entitled to use, and which is not more than 100 ft. from the site of such house; but if no such means of drainage are within that distance, then emptying into such covered cesspool or other place, not being under any house, as the Local Authority direct; and the Local Authority may require any such drain or drains to be of such materials and size, and to be laid at such level and with such fall, as on the Report of their Surveyor may appear to them to be necessary."

A second clause of the section empowers the Local Authority (in case of non-compliance with the notice mentioned above) to do the work, and to recover the expenses in a summary manner from the owner of the house, or to declare them to be private improvement expenses.

A third clause gives the Local Authority the option of constructing a sewer and causing the drains of two or more houses to empty therein, and of recovering the expenses from the owners of such houses, or of declaring them to be private improvement expenses.

The word "house" used in this section "includes schools, also factories and other buildings in which persons are employed." This definition differs from that given in the Public Health Act itself, certain words in this Act having been repealed by the Factory Act, 1878. A Dissenting chapel has been held to be a house within the meaning of the Metropolis Management Acts, as "the chapel had not been consecrated and thus dedicated to permanent and unalterable uses." What is meant by the "site" of a house is not clear; Lumley inclines to the opinion that it means "that piece of land upon which the house itself stands," and not the curtilage. Note that the section gives the Local Authority power to regulate the construction of drains in four respects and in four only—namely, (1) materials, (2) size, (3) depth, and (4) fall. It is, to say the least, doubtful whether a Local Authority can insist on the construction of inspection-chambers, and this view is indirectly supported by a recent decision, which will be noticed under Section 25.

Section 24 empowers a Local Authority to close a drain which, "*though sufficient for the effectual drainage of the house, is not adapted to the general sewerage system of the district, or is, in the opinion of the Local Authority, otherwise objectionable,*" and to construct a new drain instead of it, but the work must be done at the Local Authority's expense.

Sections 23 and 24 apply to Local Authorities both urban and rural. Section 25, however, is restricted to Urban Authorities, and to those rural districts or portions thereof to which urban powers may have been granted by the Local Government Board under Section 276.

"Section 25.—It shall not be lawful in any urban district newly to erect any house or to rebuild any house which has been pulled down to or below the ground floor, or to occupy any house so newly erected or rebuilt, unless and until a covered drain or drains be constructed, of such size and materials, and at such level and with such fall, as on the report of the Surveyor may appear to the Urban Authority to be necessary for the effectual drainage of such house; and the drain or drains so to be constructed shall empty into any sewer which the Urban Authority are entitled to use, and which is within 100 ft. of some part of the site of the house to be built or rebuilt; but if no such means of drainage are within that distance, then shall empty into such covered cesspool or other place, not being under any house, as the Urban Authority direct.

Any person who causes any house to be erected or rebuilt, or any drain to be constructed in contravention of this section, shall be liable to a penalty not exceeding fifty pounds."

The meaning of the words "house" and "site" was briefly considered under Section 23. The Local Authority's powers of regulating the construction of drains can best be illustrated by means of a recent decision, which will be quoted in the next chapter.

OBITUARY.

MR. F. W. HORNBLOWER.—We have to record the death, on December 31, of Mr. Frederic W. Hornblower, architect, of Liverpool, eldest son of the late Lewis Hornblower, a prominent Liverpool architect of his day. Mr. F. W. Hornblower was associated with his father in the laying-out of Sefton Park, Liverpool, and their joint plans were awarded the second premium when the designs for similar work at Roundhay Park, Leeds, were under consideration. The deceased was also successful in taking the second place with the plans which he submitted in conjunction with Mr. Francis Holmes for the Government and library buildings at Dublin, the first place being taken by an Irish architect. The late Mr. Hornblower was also entrusted with the execution of a large amount of private work, among others by the members of the Laird family, Lord Brassey, Sir Thomas Brocklebank, Sir F. G. Hesketh, Bart., &c. He also took a prominent part some years ago in the reconstruction of the Liverpool Architectural Society, of which he was for many years hon. Secretary, and subsequently vice-President. He gained, with his father, the first premium for the enlargement of Liverpool Corn Exchange Buildings, and also the second premium for rebuilding the Liverpool Stock Exchange. In 1886 he was awarded the first place in the competition for municipal abattoirs at Birkenhead, and the second premium for laying out Bidston Hill Estate (over 300 acres) for Mr. Vyner. Mr. Hornblower also carried out with his father a very extensive "model" village on fireproof principles at Millom, Cumberland, for the Hodbarrow Mining Co., and laid out with him a building estate near Preston some hundreds of acres in extent.

GENERAL BUILDING NEWS.

CONGREGATIONAL CHURCH, LONDON.—The London School Board having acquired the site of Trinity Congregational Church, Hanbury-street, Mile End, a new building has been erected at The Broadway, Victoria Park. The church is of red brick, and yellow terra-cotta dressings. It has been planned to permit the old gallery front and other fittings, including pews, from Hanbury-street to be used. The old organ (by Willis), with modern improvements, has been rebuilt, and several of the old stained-glass windows have been replaced. The memorial to Dr. Tyler, who was for long the minister in Hanbury-street, has been re-erected. The seating accommodation is for 800. The school, with entrances in Rutland-road, which runs alongside the church, has accommodation for 300 persons. The buildings are heated with hot water radiators, and ventilated on Honeyman's system, and lighted by electricity. The architect was Mr. P. Morley Horder.

CONGREGATIONAL CHURCH, BRISTOL.—On the 1st inst. Mr. C. E. Hobhouse, M.P., laid the memorial stone of the new Castle Green Congregational Church, which is to be erected at Greenbank, Easton. The main entrance to the chapel is in Kingsley-street. The building will be built of brick, and will accommodate 800 persons. The designs were prepared by Mr. Frank Wills, and to Mr. George Humphreys has been allotted the contract.

ELDER LIBRARY, GOVAN.—Mrs. John Elder, who some years ago gave a park to Govan, has now given to the Burgh a new library. The building occupies a site at the south-east corner of the Elder Park. The style is Classic, and the principal elevation, which is towards the corner where Langlands-road and Thomson-street intersect, contains an entrance colonnade, surmounted by a balustrade, in the centre of which will be carved the Govan coat of arms. The building consists of three floors, basement, ground, and upper. The basement contains a lavatory, furnace-room, packing-room, bookstore, and workshop. On the ground floor there are newsroom, 53 ft. by 23 ft., reference libraries for ladies and gentlemen, committee-room, and librarian's room. The lending library, which is 45 ft. by 22 ft. 3 in., and capable of storing between 20,000 and 30,000 volumes, is also situated on this floor. The feature of the entrance consists of a semi-circular colonnade, from which a vestibule is entered; that in turn leads into a broad corridor, the walls of which are of marble and mosaic. From the corridor a stair leads to the upper flat, which is intended to be used as a museum and juvenile room, separate days being formed in the latter for boys and girls. From the roof, and over the centre of the front entrance, rises a small dome. The architect is Mr. J. J. Burnett, A.R.S.A., Glasgow.

BUILDING IN DUNFERMLINE.—1901 has been a busy one in connexion with the building trade in Dunfermline, and there is every prospect of 1902 being one of the most active experienced in the city. So far as large buildings are concerned, building has been confined to the completion of St. Leonard's School, Pilmuir Works, and the extension of St. Margaret's Roman Catholic School during 1901. This year Pittencrieff School and the new baths and gymnasium are to be erected. In addition to these public buildings, a big increase is to be made in the dwelling-house accommodation of the city. The agitation about the housing problem has brought the necessity for workmen's houses specially before people who like to invest money in building property, and within the past two months such a number of plans for tenements of workmen's houses have passed the Dean of Guild Court as give the impression that the housing problem will soon be solved in Dunfermline.—*Dunfermline Journal.*

CO-OPERATIVE HOUSING SCHEME, PLYMOUTH.—The Plymouth Co-operative Society have inaugurated a scheme for the erection of workmen's cottage dwellings at Laira. The site, acquired three years ago, embraces an area of twenty-three acres, divided into five fields, situated on the southern slope of a rather steep hill overlooking the Laira Old-road. The plans which have been passed by the Corporation provide for the laying out of the estate in streets running along the face of the hill parallel to the Laira-road. It is intended to erect in the first instance 120 four-room cottages. With a frontage of 16 ft. each, the dwellings will be two stories high, and built of brick, with a bay window on each floor. On the ground floor will be a kitchen and parlour, with a scullery in the rear, and on the first floor two bedrooms and a bathroom. In front of each dwelling will be a small garden. Eventually it is intended to build about 500 houses on the estate. Their erection will be carried out by the society itself under the direction of Mr. E. Carwithen, manager of the Works Department.

INFIRMARY, WORKSOP.—On the 1st inst. Mr. Sydney Smith, J.P., Chairman of the Worksop Board of Guardians, laid the foundation-stone of the new Kilton Hill Infirmary, which is being erected for the purposes of the Union by Messrs. J. H. Vickers, Ltd., Nottingham. The building, which will comprise wards for eighty-four male and female patients, administrative and receiving blocks, connected by corridors, porter's lodge, mortuary, stables, &c., is being erected from the designs of Mr. Herbert C. Scaping, of Grimsby. It is to be of brick, with stone dressings, and the contract price is 15,490*l.* The site acquired by the Guardians is eleven acres in extent.

HARROGATE KURSAAL.—The memorial-stone of the Kursaal which is being erected at Harrogate was laid on the 1st inst. by the Mayor, Alderman David Simpson. Mr. R. J. Beale is the architect, and Messrs. Graham & Sons the contractors. The building was illustrated and described in our issue for September 16, 1899.

BUILDING IN BELFAST.—Various causes have combined to keep the building trade in a rather somnolent condition during the past year. The length and duration of the war has no doubt caused some little deflections in the prosperity of the trade as a whole, most people preferring to wait until a time more befitting for the spending of money in any new venture. The building of artisans' dwellings has slackened off much during the last year. The strike in the carpentering branch, which was reported last year, was settled satisfactorily some months ago, both employers and employés conceding several points to arrive at an amicale solution, and many differences which may have been caused by this regretted disturbance of the skilled labour market have now totally disappeared. Prices of steel and iron products used for building purposes have resumed their normal condition. The rear portion of the new City Hall appears now to be almost completed as regards the outside stonework.

PUBLIC OFFICES, YARDLEY, BIRMINGHAM.—Yardley's new public offices adjoin the Sparkhill Police-station. They have been erected and furnished at an approximate cost of 14,000*l.* The building is Renaissance in style, and is of brick with stone dressings and Cotswold stone tiled roof. The design is symmetrical, there being a gable at each end, whilst the central portion is relieved by a circular bay running up to the roof. The arches of the gables are filled in with stone figures carved by Mr. Benjamin Creswick, and the roof surmounted by a small turret. At the north end is a clock tower about 80 ft. high. There are two entrances at the front. One communicates with the main staircase leading to the council chamber, and the other is adapted for visitors to the Surveyor's department. On the ground floor there are eight offices. Two of these, a general and a private office, are reserved for the Clerk to the District Council. The rate collectors will be accommodated in two offices. The department of the District Surveyor (Mr. Arthur W. Smith) will occupy a considerable portion of the ground floor, and will comprise a general office, clerks' office, private office, and plan store, and provision is also made for the sanitary inspectors' department. A stone staircase leads to the first floor, and opens on to a long corridor, broken into bays by piers and panelled ceiling, and running the whole length of the Council Chamber and committee-rooms. The Council Chamber measures 50 ft. by 27 ft. It is entered through double swing-doors at each end. To the height of 4 ft. 6 in. the walls of the chamber are panelled; the roof is open-timbered, supported by five principals springing from carved stone corbels; and the apartment is lighted by stone mullioned windows and leaded lights facing Stratford-road, and a line of clearstory windows, filled with stained glass, on the opposite side. The oak mantels at each end have the monogram of the Yardley District Council in the centre. In addition to a couple of committee-rooms, one on either side of the chamber, the surveyor's drawing-office and a "Mayor's parlour" in miniature, two rooms have been reserved on the first floor as retiring-rooms. There are extensive buildings at the rear of the main block. Entering from Court-road is the depot comprising fire-station, mortuary, stabling, blacksmiths' and wheelwrights' shops, lamp-store, harness-room, fodder and coal stores, mess-room for the firemen, &c. The buildings are heated on the low-pressure system and by radients. Provision has been made for electric lighting, but for the present gas will be used. The buildings have been erected to the designs of Mr. Arthur Harrison, of Birmingham, who also designed the fittings and furniture, supplied by Chamberlain, King, & Jones, Ltd. Mr. William Bishop, of King's Heath, is the builder.—*Birmingham Gazette.*

HOSPITAL BUILDINGS, SEACROFT.—The Sanitary Committee of the Leeds Corporation are about to receive tenders for the erection of twenty-six blocks of buildings for the extension of the City Hospital at Seacroft. The plans have been prepared by Mr. Edwin T. Hall, architect, London.

HOTEL, DONCASTER.—A contract for the erection of a new hotel, to be built at the corner of Bridge-terrace and Hexthorpe-road, Doncaster, for Messrs. Hewitt Bros., Ltd., brewers, Grimsby, and for pulling down the property at present on the site, a portion of which is required for street improvement, has been secured, at about 2,000*l.*, by Messrs. Mullins & Richardson. The new hotel will be built under the superintendence of the architect, Mr. Athron, of Doncaster.

BUILDING IN BRADFORD.—The building trade, which was certainly quiet previous to May 1, was almost stopped at that date by the dispute as to reduction of wages and alteration of rules. For obvious reasons, there have been few contracts let, or even tenders asked for, since the early part of the year. Of the contracts let were a new warehouse in Peckover-street for Messrs. Edelstein, Moser, & Co., the permanent tramshed for the Corporation at Duckworth-lane, the new passenger station at Bowling Junction for the Lancashire and Yorkshire Railway Co., a relief station at Usher-street for the Bradford Board of Guardians, an extension of the Lidget Green Board School, an enlargement of the Corporation Electricity Works at Valley-road, a new warehouse for the Yorkshire Woolcombers' Association at Fairweather Green, and an alteration of Bowling Dyeworks for the Bradford Dyers' Association. Notwithstanding the labour dispute, a number of house-builders have proceeded, with the result that although not so many houses as in former years have been put up, there has been a fair increase in this class of property. The local stone industry has, in conjunction with the building trade, been necessarily quiet, with diminished prices in some classes, but the provincial and London trades have remained fairly good throughout the year, and prices have been well maintained. Locally the timber trade has felt the effect of the curtailment of building operations, but the general and miscellaneous demand has been fairly good.

NEW THEATRE AT MOTHERWELL, EDINBURGH.—The opening ceremony in connexion with the New Century Theatre at Motherwell took place recently. The new theatre, which has been erected at a cost of over 11,000*l.*, is situated in Windmillhill-street. The architect is Mr. Alexander Cullen. The theatre is a two-tier one, and will provide accommodation for about 1,500. The stage is 35 ft. by 50 ft., with proscenium opening of 26 ft.

BUILDING IN DUNDEE.—Mr. Thomson, Assistant Burgh Engineer, reported to a meeting of the Works Committee of Dundee Town Council on the 30th ult., that during the year 1901 the Town Council had approved of 205 new buildings in the city, the total value being 143,000*l.* He stated that thirty-six more plans and sections were approved of during the year than in the past year, but the money value represented a decrease of 15,000*l.*, caused by the buildings erected during the year being of a less important character.

CONGREGATIONAL CHURCH, NORTHAMPTON.—The foundation-stones of the new Congregational Church on Primrose Hill, Kingsthorpe-road, Northampton, were laid recently. The chapel, which is in the Renaissance style, will be of red brick, with white stone dressings. The entrance, which is about 10 yards from the road, will have a bold stone portico, through which entrance to the vestibule will be gained. The auditorium, which will be practically square, will have a domed roof, surmounted by a ventilating turret. The gallery will be at the rear, above the vestibule. The chapel, when opened, will accommodate a congregation of about 500 persons. The cost of the building, excluding the site, will be about 2,800*l.*, and the total cost will be about 3,000*l.* Mr. Alexander Anderson, of Northampton, is the architect; and Mr. G. W. Souster, of Northampton, the builder.

NEW THEATRE FOR NORWICH.—It is proposed to erect a new theatre at Norwich, from plans prepared by Mr. W. G. R. Sprague, of London. The contract for the building has been given to Messrs. Kirk & Randall, of Woolwich. The upholstering will be done by Messrs. Dean & Co., of Manchester, and the decoration by De Jong, of London. The theatre will be built to seat about 2,000 persons. The stage will be 70 ft. broad and 45 ft. deep.

NEW BUILDINGS, NEWCASTLE BREWERIES, LTD.—In connexion with the annual meeting of the Newcastle Breweries, Ltd., held for the first time at the new offices of the Company in the Haymarket, Newcastle, the shareholders were invited to inspect that building, and also the buildings behind, containing the Company's mineral-water factory, wine and spirit stores, and duty-free bond. The main building of the factory, about 120 ft. by 80 ft., by 60 ft. high, contains four floors, the three lower ones being divided into two nearly equal sections. In one section the basement is occupied by beer-bottling stores, and the ground and upper floors by the mineral-water works. In the other section the whole of the floors are occupied as duty-paid wine and spirit stores. In front of this main building there is a large receiving yard, with loading-out quays, approached from the Haymarket by two alternative roadways, and the basement extends under this yard. Large hoists, driven by electricity, connect the loading quays with the various floors above and below. Behind the main building is a large covered yard, among the buildings surrounding which is an electric power station. At the extreme end of the factory building there is stabling for thirty-six horses. On the top floor above the stables there is a granary. Abutting on the stable-yard are coopers' and joiners' shops, harness-room, shoeing-forge, &c. Dining-rooms for the workpeople are also provided. In the basement under the stable-yard there is extensive cellarage connected with and reached through the company's bonded warehouse in St. Thomas's-street. The new office buildings front on the Haymarket. The exterior is of polished granite plinth, and red brick and stone superstructure. In all the rooms the floors are of oak, and the doors

panelling, chimney-pieces, and other fittings of mahogany. In the basement, besides the strong-rooms, there are wine cellars, lavatory accommodation for the office staff, and the Plenum heating and ventilating apparatus. Mr. Walter Scott was the general contractor for the whole of the buildings, and the architects were Messrs. J. Oswald & Son, of Newcastle.

NEW BUILDINGS FOR GLASGOW PARISH COUNCIL.—New offices for Glasgow Parish Council are being erected from the designs of Messrs. Thomson & Sandilands, architects. The buildings are situated in George-street, immediately opposite the side group of the municipal buildings. The lower part has been kept plain, while above is a series of columns in strong relief, grouped in pairs, supporting a massive cornice and balustrade. The side wings are treated so as to give emphasis to the dome of the central portion. The ground floor is to be occupied by the treasurers and collectors, the first floor by the clerical staff, the second floor by the rooms of the chairman and the principal officials; while the third floor has the board-room, an apartment rising through two stories. When finished the lower part of the walls is to be covered with mahogany panelling, above which rise pilasters surmounted by ornament in bold relief. The rear section of the building is arranged for the purpose of relief of the poor. This section is connected by corridors besides the special entrance by John-street for the relief of applicants. The following are the principal contractors:—Mason and joiner, Messrs. William Shaw & Son; slater, Messrs. Hamilton & Co.; plumber, Mr. Robert S. Renfrew; plasterer, Messrs. Stevenson & Leitch.

ROYAL VICTORIA EYE AND EAR HOSPITAL, DUBLIN.—New buildings are being erected in connexion with this hospital in Adelaide-road. The new building will unite under one roof St. Mark's Ophthalmic Hospital, Lincoln-place, and the National Eye and Ear Infirmary, Molesworth-street. The new buildings will consist of the hospital proper, fronting Adelaide-road—to accommodate 120 indoor patients, with nursing staff—and an out-patients' department. The main frontage of the latter will be in Hatch-lane, by which the out-patients will reach it. The hospital proper will consist of a building of four stories, including the basement. The official and operating block is in the centre, connected by the main corridors with the pavilions, beyond which again are the sanitary annexes. The entire basement will be utilised. The architects are Messrs. Carroll & Batchelor, Dublin; and the general contractors are Messrs. J. & P. Good, Ltd.

MUNICIPAL SCHOOL, GRAVESEND. — Additions have recently been made to this building in Darnley-street. The new assembly hall, 60 ft. by 30 ft., is the central feature. The entrance to the buildings for the girls, with their necessary offices, is at the north-east corner of the hall, whilst those for the boys are at the south-east corner. The hall has on its north side the four old large classrooms, the lighting of which has been improved. It has on its south side a classroom, 30 ft. by 20 ft; a carpenter's shop, averaging 17 ft. by 30 ft.; and a vestibule, which leads to a physical laboratory, 24 ft. by 30 ft., and to a staircase communicating with the first floor, on which are placed a kitchen, averaging 17 ft. by 30 ft.; a classroom for seniors, 25 ft. by 20 ft; the head-master's room, 13 ft. by 19 ft. (also intended to be used as a committee-room); and the chemical laboratory, 24 ft. by 30 ft. Though the connexion is direct with the classrooms generally, the external entrance to the chemical laboratory is from the open landing, by which means it is hoped to render the school free from unpleasant odours. This landing also forms the connexion with the first floor of the original building. Store and cloak rooms have also been provided. The assembly hall will also be used for calisthenics and gymnastics. The playground for the girls and that for the boys have been cemented, whilst the latter has been considerably enlarged. Mr. E. J. Bennett was the architect, and Messrs. Multon & Wallis the builders.

SANITARY AND ENGINEERING NEWS.

SEWAGE DISPOSAL, STAINLAND, YORKSHIRE.—Mr. W. O. E. Meade-King, C.E., conducted a Local Government Board inquiry in the Stainland Mechanics' Hall on the 31st ult., into an application for sanction to borrow 16,200*l.* for outfall works and sewerage. Mr. Charles Henry Hebblethwaite, the engineer, having explained the scheme, was cross-examined at length.

DOCK IMPROVEMENTS, LONDON.—To meet the demand for more accommodation for large vessels in the Port of London, the directors of the London and India Docks Co. have for the last two years been carrying out alterations and new works at the river entrance to the South-West India Dock. These works have just been completed, and the temporary dams are being removed, so that vessels 450 ft. long and of a carrying capacity of 6,000 tons will be able to enter the dock by the new lock. This dock is, with the exception of Tilbury, the deepest in London, having a depth of 29 ft. With its basin, it has an area of 32 acres, and the quay walls are of sufficient length to accommodate twelve ships 450 ft. long, in addition to a few shorter vessels. But as the old entrance lock was only 300 ft. long, with a depth of 27 ft. on the sill in the centre, reduced to 24 ft. at the sides of the invert, it was decided to increase the length to 480 ft. and lower the sill and invert to 29 ft., and also to construct under the lock a sewer for the London County Council for the drainage of the Isle of Dogs, to replace an old sewer in the bed of the river in a somewhat dangerous position across the entrances to several docks. To exclude the water from the site of the works the contractors placed a timber caisson across the lock at the river end and drove a semi-circular dam in the basin. This dam had a length of 360 ft., and was formed of a single row of double timber piles 45 ft. to 50 ft. long by 26 in. thick, driven 15 ft. into the bottom of the basin, and supported at the top by a timber rib 16 ft. wide to preserve a true circular curve to the dam. The bottom of the basin, being composed of very fine silt and running sand, gave a great deal of trouble, and serious delay occurred in consequence of the water blowing up under the piles until the contractors weighted the bottom with a bank of sand in bags 15 ft. high, and tipped a bank of clay on the water side, after which the dam was perfectly watertight and stood very well. The extra pair of gates required for the extension were obtained from another part of the dock where they were no longer required. As the mud in these docks causes great inconvenience in working the gates, iron pipes connected with the sluice culverts have been embedded in the concrete of the new gate platform, so that the act of lowering the water in the lock draws away the mud from the roller paths. The sluices are in duplicate, one set worked by hydraulic power, the other by hand in case of a breakdown. The sewer, which is 500 ft. long, is carried under the lock by two cast-iron culverts, each 4 ft. 6 in. in diameter, bedded in concrete. These culverts enter penstock chambers 50 ft. deep, built in brickwork through the centre of each quay wall, and can be closed by hydraulic sluices. The approach sewers on either side from the public road are 4 ft. 9 in. in diameter, and built of brickwork in tunnels which were driven through the sand. The cost of the works, including the sewer, has been about 52,000*l.*—*Times.*

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—The partnership of Messrs. Dalgleish & Dickens-Lewis, architects, of Shrewsbury, has been dissolved, and they will practise separately at the undermentioned addresses, viz., Mr. C. R. Dalgleish at Central Chambers, Wellington, and 18, Talbot Chambers, Shrewsbury; and Mr. G. Dickens-Lewis at 12A, Talbot Chambers, Shrewsbury.

CHURCH OF ST. STEPHEN, POPLAR.—A faculty has been granted by Dr. Tristram, K.C., Chancellor of the Diocese of London, for the erection of a side chapel, and the placing therein of a second Holy Table, in the parish Church of St. Stephen, Poplar, which was built in East India-road in 1866, after Francis's plans and designs.

ELECTRIC LIGHT, LONG EATON.—On the 1st inst. Colonel W. Langton Coke, C.E., held an inquiry in the High-street Board School, Long Eaton, touching the application to borrow 15,000*l.* for the installation of the electric light at Long Eaton. Mr. Williams, Clerk to the Council, explained that the Report of Mr. Crowther, electric engineer, Wallasley, was practically endorsed by Messrs. Hopkinson & Talbot. Time had been lost, and the Council had lost customers, and unless the matter was proceeded with expeditiously more customers would be lost. Provisional contracts had been entered into for the work. Mr. J. H. Crowther and Mr. Worrall, C.E. (Surveyor) gave evidence as to the details of the scheme.

HOUSING, BLACKLEY ESTATE, MANCHESTER.—The Sanitary Committee of the Manchester City Council instituted recently a series of inquiries into certain objections raised by the Citizens' Committee as to proposals of the Council for the execution of the first set of houses on the Higher Blackley Estate, which was purchased some time ago under the Allotments Act. As a result of investigations by the Housing Sub-Committee and the City Surveyor, new plans were prepared for adoption by the Sanitary Committee, and the Local Government Board will be asked to give their approval to these. In the main the new plans are drawn upon the lines adopted in some model cottages recently erected at Leek, Staffordshire. They provide for several improvements on the original proposals. The chief additions are a bathroom and a bedroom, the bathroom being placed on the ground floor immediately behind the kitchen fireplace. Folding doors are placed between the bathroom and the scullery to give access and to separate the two apartments when the bath is in use. The bath is available for washing purposes generally, and will be fitted with a shower appliance. The bath will be supplied with water automatically, and will have an independent small fireplace underneath it for use during hot weather, when the kitchen range is not required. The third bedroom is in the centre of the building, the floor being 3 ft. 6 in. higher than that of the bedrooms. The light is derived from a dormer window set back in the roof and overlooking the main street at the front. The alterations in the scheme will involve an additional expenditure of about 7,000*l.*—*Manchester Courier.*

LONDON TOPOGRAPHICAL SOCIETY.—In regard to the remarkable survey drawings of the roads of Knightsbridge, made by Salway in 1811, and referred to in the article on old Knightsbridge in our last, we are glad to hear that the London Topographical Society are issuing a reproduction of this remarkable work. There are thirty sections of the plan, extending from Hyde Park Corner to Counter's Bridge, some of which have been issued to members of the Society, and the remainder will be in their hands during the year.

ASPLEN'S TRENCH CUTTER AND ROAD SCARIFIER.—This newly-patented machine is mounted on a trolly provided with draw-bar so that it may readily be transported from place to place. When required for use, the apparatus can be attached to any road-roller or traction-engine, and the larger size has a side attachment for this purpose. The portion carrying the teeth is adjustable by means of a central handwheel and screw, at each side of which are smaller screws for regulating the teeth themselves.

CAPITAL AND LABOUR.

THE BRADFORD BUILDING TRADE DISPUTE.—Negotiations between the representatives of the labourers employed in the Bradford building trade and the Bradford and District Master Builders' Association have resulted in the settlement, so far as the labourers are concerned, of the dispute which has been in progress since May 1. The cause of the dispute was the refusal of the masters to grant an advance of 1d. per hour in the wages paid, and the men left work at the same time as the masons and joiners, who were, and are still, resisting a reduction of ½d. per hour and certain alterations in the rules regulating employment. Recently the secretary of the Labourers' Union wrote to the Master Builders' Association stating that the men desired to withdraw their demand for an increase of wages, and asking that they might be reinstated as early as possible, without prejudice or malice. A conference followed, at which the men expressed their willingness to come to terms on the basis of the arrangement which prevailed in 1894. This offer was accepted, and the masters decided to circularise the federated employers, stating that "Although they feel that it will be difficult to find employment for all the men at once, it is hoped they will replace the men as early as ever possible without prejudice." The terms of settlement provide that the wages shall be 6d. per hour. During the course of the dispute the men have been in receipt of 10s. a week as strike pay, but the funds are now nearly exhausted. The number of men ready to start work again is about 120. As regards the masons and joiners, the settlement of the dispute seems as far off as ever. In both cases the men are receiving an out-of-work allowance of 1*l.* per week, and as they have wealthy unions behind them, it would seem that they will be able, unless the improbable contingency of a general strike should arise, to continue the struggle indefinitely.—*Yorkshire Observer.*

BUILDING DISPUTE AT MAIDSTONE.—A dispute has arisen between masters and men in the building trade in Maidstone, as to the hour at which the latter should start work during the winter months. One of the largest firms in the town has locked out its men because they arrived at 8.30 instead of 8 p.m., the time fixed by the Master Builders' Society.

PERTH PLASTERERS' STRIKE. — Some time ago the master plasterers of Perth sent a circular to the men intimating a reduction of wages from 8½d. to 8d. per hour. The men thereupon came out on strike. A meeting of the masters and men was held a few days ago, when the masters agreed to a compromise—that the wages would be reduced on and after March 10. A letter has since been received by the secretary of the Masters' Association from the men's secretary intimating that the men were quite prepared to accept the terms offered.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

15,954. — A MOTOR FOR GENERATING ELECTRICITY: *D. McGregor.*—A vertical spindle carries a drum upon which blades are mounted, the opposite pairs of blades being linked together and so arranged that as the water current extends one blade the other blade becomes closed against the drum. For a tidal current the water is directed with hinged flaps which will be reversed as the tide turns. The top of the drum is fairly level with the stream, and the drum may be caused to slide upon the shaft, and, through its own buoyancy, to adjust itself to variations in the level, or it may be carried upon floats in wells of which the buoyancy can be adjusted at will by changing the amount of air that they contain.

16,122.—SAFETY MECHANISM FOR LIFTS AND ELEVATORS: *C. L. Buddenbohn & W. Speer.*—A

governing mechanism automatically causes cams upon a flexible rock-shaft carried by the car to engage with their guide-rails when an excessive rate of speed is attained. It has a rotary shaft, from which extend arms, of which the spring-pressed side-blocks can be thrown outwards by the rotation of a pulley, and is driven with a shaft-cord passed around pulleys and weighted at its lower end. The flexible shaft is worked, in opposition to a dead weight, with a vertical slide joined with a chain to a bell-crank lever pivoted on to the car, in which is a hand-lever joined to a bent link that will serve by means of its vibration as an indicator, and can be used for arresting the car.

16,123.—A BRAKE FOR USE WITH FIRE-ESCAPES: *C. L. Buddenbohn and W. Speer.*—For an automatical brake the inventors pass the lowering rope from an idle reel many times around the drum and thence to the escape-sling. A sleeve upon the main axis is rotated at a high speed by gearing from the drum, and its radial arms carry sliding weights, which centrifugal force acting in opposition to springs will impel outwards; the rate of descent can be regulated by means of the action of the weights on inclined planes, so as to press braking-shoes against the sides of the drum; for a more rapid descent one can control the movement lengthwise of the sleeve with a face-cam and lever, and for arresting it another lever is fitted; a fixed ring, having a spiral groove, guides the turns of the rope sideways; spring-pegs force the rope against the drum, which should have a polygonal periphery.

16,132.—A TRAP FOR DRAINS: *F. Edrick.*—In order to prevent back-flow a flap-valve is adjusted at one end of a cone-shaped length of pipe; a disc faced with indiarubber, and having an eccentrical orifice, constitutes the seating of the valve, which is made of a rubber disc encased within two smaller metallic discs.

16,164.—AN ELECTRICAL CURRENT METER: *A. C. Heap.*—The novelty consists of an improved mounting of the coil, a divided magnetical circuit, and insulated magnets (in order to obviate electrostatical effects) for a moving-coil ampère or volt meter for continuous current. An open, rectangular, metallic frame upon which the coil is wound has end-holes that fit upon an undivided axle which extends through the coil and to which the coil is clamped with nuts, one end remaining free enough for expansion by variations of temperature. There are two spiral controlling and connecting springs and a balanced pointer. Two angle-pieces upon a base-plate carry two permanent magnets which have four pole-pieces. On each angle-piece is a semi-cylindrical core that will pass between the axle and the coil. The insulated base-plate carries the scale of the meter, being joined with the circuit for prevention of electrostatical effects or discharge between the magnets and the coil when the flow of a high-pressure circuit is being measured. In another shape one magnet only is used; it is mounted upon a fixed bracket which carries one half-core and two pole-pieces that fit within the magnet, which carries the other half-core and two pole-pieces, together with the scale.

16,166.—AN ADJUSTMENT FOR WINDOWS: *E. Reiss.*—A lazy tongs frame-work joins the window or skylight to the frame, as well as to a set of louvre frames. For purposes of lifting, a rod with levers or other gear is provided. One line of pins are guided in slots of the frames, the other line of pins are pivoted on to the frames.

16,167.—CONSTRUCTION OF PAVEMENTS: *A. Metz.*—A thin stratum of melted bitumen or asphalt is laid over a cement foundation of lime or common cement; in or upon that is laid a strengthening frame, made of either cement roughened blocks or a trellis-work of sheet metal. Above is laid an admixture of bitumen, asphalt, gravel and ground stone. Before the topmost layer has become set, a non-slipping surface is spread over it, consisting of ground stone, rammed and rolled.

16,193.—FASTENERS FOR WINDOWS: *G. C. Brown.*—For sashes that can be turned inwards (*see* No. 23,489 of 1898) is devised a flanged and slotted locking-plate to which the cord is secured, and which will engage with a sash-plate, being held with a spring catch which passes into the slot as one turns the sash inwards; with the turning of the sash into the frame again the catch is forced back out of action by means of a bevelled projection upon the sash-plate. In the pulley-stile is a recess within which a portion of the parting-bead will slide backwards against the pressure of springs, and wherein it will be held by an inclined and flanged bolt that slides down through its own weight; the bolt is forced backwards as one lifts the sash in its frame so that the freed parting-bead will thereupon spring out.

16,220.—TREATMENT OF SMOKE: *W. Wild and D. Rigby.*—The smoke from kilns, furnaces, &c., is washed with water or milk of lime as it passes through a receiver fitted with balls or pierced plates of earthenware, wood, metal, &c., and dipped into a trough of water. The smoke is conveyed thence into a set of inverted troughs, which are dipped into water or milk of lime in a second chamber, narrow slots are made in the bottom edges of the troughs for the passage of the smoke, and a fan, or steam jet, draws the washed smoke into the chimney.

16,233.—PAVING-BLOCKS, PAVEMENTS, &C.: *A. Metz.*—Slabs, tiles, panels, &c., of granite, and so on are embedded in a layer of cement or asphalt for a non-slipping surface. They are laid upon a cement or concrete bed, over a shallow layer of asphalt or cement (as above). *See also* No. 10,841 of 1896.

16,241.—A CHECK FOR DOORS AND GATES: *T. Clements.*—A spiral spring forces a roller having a rubber tyre on to the floor, its casing being secured to the door, and its tension controlled with a screwed cap; a crank or an eccentric upon the door handle enables one to raise the spring as one opens the door; a connecting rod from the crank has a pin that works within a vertical slot having an L-head, whereby the roller is sustained by the lifting and turning of the rod; it is stated that the door will be held in any position by the friction of the roller against the floor.

16,248.—A SOCKET FOR ELECTRICAL COUPLINGS: *G. A. G. Davies, H. W. Kent, and B. G. Stewart.*—The insulating body of a floor or wall socket is fashioned with an extended part that fits into a recess formed in an insulating-disc of porcelain, &c., affixed with screws so that the metallic portions shall not be liable to accidental short-circuiting; dirt can escape from the metallic tubes through apertures in the insulating-disc.

16,301.—A VENTILATING SHAFT-TOP: *F. Orr and T. McCulloch.*—Two compound hollow cones, whereof one is encompassed by the other and which are held asunder with fins, divide the top portion of a flared shaft into inner and outer passages having a common axis. At the top of the inner cone is a covering cap, and at its base is a small inverted cone secured within the outer cone; a change of position for the ducts is provided by means of slotted tongues upon the fins that engage with rivets on the flange of the head-piece, or the parts can be kept down in position with a bolt from the cap to a saucer which collects the rain.

16,311.—SLEEVE AND SPIGOT-AND-SOCKET JOINTS: *F. Wigham and G. A. Wigham.*—The inclined faces of the half-socket of the one pipe will engage with the similar faces upon a loosely sliding sleeve, a recess being provided for the packing material.

16,380.—MECHANISM FOR WEIRS: *Vereinigte Maschinenfabrik Augsburg und Maschinenenbau-A. G. Nürnberg A. G.*—To provide means of opening a weir against the action of ice, alluvium, and so on, a beam which is laid across the top of the weir wall carries a roller, made up of strong iron plates arranged at a radius about equal to the height of the normal water-level above the beam. Water can pass into or out of the roller through holes in its ends, which repose in quadrants. A motor serves to turn chain-wheels at the ends of the roller, whereby a toothed ring upon the roller engages with an inclined, or otherwise a horizontal, rack so as to lift the roller.

16,381.—A WATER-BOILER FOR DOMESTIC AND OTHER USES: *O. Whitaker and G. Whitaker.*—A dish-shaped earthenware cover having a rib upon its under surface and being salt-glazed or enamelled upon its top surface and fitted with a hinged lid that affords access to the boiler, is made for the casing. A damper regulates an opening which is formed between the hood, which conveys steam from the pan to the uptake, and the uptake itself. The hood can be bolted to the cover by means of a groove having dove-tailed edges. For the boilers confer No. 19,368 of 1898.

16,393.—A VENTILATION-TOP FOR SHAFTS AND CHIMNEYS: *W. H. Dingle and J. M. Urquhart.*—An under-hood fashioned with a convexed side and a re-entering side, that contract the passage between its two flat sides, is mounted upon the conical outlet of the chimney-top. At the mouth of the cone, and above the air-inlets made with the space between the hood and the cone, are set two deflectors, and there is another deflector underneath an outlet in the side of the bend. In another shape, the hood takes the form of a wide bottle, and within it are disposed two deflectors which provide a bent or zig-zag passage, which in that case has no outlet in its side.

16,430.—HOISTING APPARATUS FOR BUILDERS' USE: *L. Müller.*—The apparatus is intended for use in the building or repair of chimneys. A framing, through which a pair of pins is inserted, is laid upon a socket or pillar, which is carried by cross-bars built into the chimney. Two pulleys with ball bearings are mounted on the two pins, and another pulley is carried by the forked end of the stem of the pillar. The distance between the two end pulleys on the pins may be altered by means of holes made at intervals in a pair of parallel bars that constitute the framing, the holes being formed for engagement with the pins.

MEETINGS.

FRIDAY, JANUARY 10.

Architectural Association Discussion Section.—Mr. P. W. Mulready on "The Work and Influence of Augustus Welby Pugin." 7.30 p.m.

Birmingham Architectural Association.—Mr. John Ward on "Pictures from Penzance and the Land's End."

Glasgow Architectural Craftsmen's Society.—Mr. A. B. M'Donald, M.Inst.C.E., on "The Highlands of Central Europe." 8 p.m.

SATURDAY, JANUARY 11.

Dundee Institute of Architecture.—7 p.m.

MONDAY, JANUARY 13.

Surveyors' Institution.—Mr. John H. Hanson on "Rivers' Pollution: Purification of Trade Waters from a Mill Occupier's Point of View." 8 p.m.

Society of Arts (Cantor Lectures).—Dr. Samuel Rideal, D.Sc., F.I.C., on "The Purification and Sterilisation of Water." I. 8 p.m.

Clerks of Works' Association (Carpenters' Hall, London-wall, E.C.)—Mr. Herbert M. Ellis on "William Morris, Poet, Artist, and Craftsman." 7.30 p.m.

Bristol Society of Architects.—Mr. F. Bligh Bond on "Rood Screens, English and Continental," with lime-light illustrations." 8 p.m.

Clerks of Works Association (Carpenters' Hall).—Paper by Mr. Herbert M. Ellis. 8 p.m.

TUESDAY, JANUARY 14.

Institution of Civil Engineers.—Mr. H. B. Molesworth on "American Workshop Methods in Steel Construction." 8 p.m.

Institution of Electrical Engineers (Glasgow Section).—"Practical Notes on Continuous Current Distributing Mains," by Mr. John C. A. Ward. 8 p.m.

WEDNESDAY, JANUARY 15.

Society of Arts.—Mr. Frank J. Gray on "Elliptographs." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Annual meeting of the members. 8 p.m.

Northern Architectural Association.—Mr. J. Bruce on "Recent Data Concerning Concrete Beams and Concrete Floors." 7.30 p.m.

British Archæological Association.—8 p.m.

THURSDAY, JANUARY 16.

Royal Institution.—Dr. A. S. Murray, F.S.A., on "Recent Excavations at Delphi and in the Greek Islands." I. 3 p.m.

Leeds and Yorkshire Architectural Society.—Dr. N Bodington, Principal of the Yorkshire College, on "Schliemann's 'Troy.'" 6.30 p.m.

FRIDAY, JANUARY 17.

Architectural Association.—Mr. T. C. Cunnington on "Architectural and Constructional Engineering." 7.30 p.m.

Royal Institution.—Rt. Hon. Lord Rayleigh on "Interference of Sound." His Grace the President will, after the discourse, unveil and present to the Institution a bust by Mr. Onslow Ford, R.A., of Sir Frederick Bramwell, Bart., D.C.L., LL.D., F.R.S., Hon. Secretary of the Royal Institution from 1885 to 1900. 9 p.m.

Institution of Civil Engineers (Students' Meeting).—Captain H. Riall Sankey on "The Theory of Heat-Engines." 8 p.m.

Institution of Mechanical Engineers.—(1) Nomination of officers for election at the annual general meeting on February 21; (2) Mr. H. F. L. Orcutt on "Modern Machine Methods." 8 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

December 17.—By W. & T. T. Iveson (at Newcastle).

Thorneyburn, Northumberland.—Low Eals Farm, 195½ a. f.	£5,130
Thropton, Northumberland.—A freehold farm, 41¾ a.	2,150

December 19.—By ROGERS BROS.

Dulwich.—25, Lordship-lane, u.t. 78 yrs., g.r. 5l. 5s., r. 30l.	300
2 and 4, Hansler-rd., u t. 79 yrs., gr. 10l.	525
128 and 130, Melbourne-grove, u.t. 74 yrs., g.r. 13l., r. 60l.	555

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS &c.

	£	s.	d.			
Hard Stocks	1	12	0	per 1,000	alongside,	in river.
Rough Stocks and Grizzles	1	10	0	,,	,,	,,
Facing Stocks	2	12	0	,,	,,	,,
Shippers	2	8	0	,,	,,	,,
Flettons	1	8	0	,,	at railway	depôt.
Red Wire Cuts ..	1	12	0	,,	,,	,,
Best Fareham Red	3	11	0	,,	,,	,,
Best Red Pressed Ruabon Facing.	5	5	0	,,	,,	,,

[*See also page 51.*

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.	Designs to be delivered
*Plans for Rebuilding Institution	Liverpool Infirmary Committee	Four Premiums of 50*l.*	Jan. 31
*Laying-out Pleasure Ground	Aldershot U.D.C.	20*l.*, 10*l.* and 5*l.*	Mar. 1
*Proposed Public Offices	do.	100*l.*, 75*l.* and 50*l.*	Mar. 29
*New Buildings at Langho, near Blackburn	Chorlton, &c., Jt. Asylums Com	200*l.*, 150*l.* and 100*l.*	April 4

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c, Supplied by	Tenders to be delivered
*Making-up Russell-rd. Herbert-rd. &c., West Hendon	Hendon U.D.C.	S. Slater, Grimley Public Offices, Hendon, N.W.	Jan. 13
*Paving Materials	Metropolitan Borough of Stepney	M. W. Jameson, 15, Great Alie-street, Whitechapel, E.	do
Repairs to Salvation Barracks, Neyland		S. W. Evans, Architect, Front-street, Neyland	Jan. 14
School, Oak-street	Bath School Board	W. J. Willcox, Architect, 1, Belmont, Bath	do.
Inn, Westgate, Rotherham	R. J. Bentley's Trustees	G. A. Wilson, Architect, Hartshead Chambers, Sheffield	do.
Police Station, Woodhouse, near Sheffield	Standing Jt. Com. West Riding C.C.	J. V. Edwards, County Surveyor, Wakefield	do.
Cottage, Clontail	Ardee (Ireland) R.D.C.	L. Turley, Civil Engineer, 17, Laurence-street, Drogheda	do.
Road Works, Walton-street, &c.	Enfield U.D.C.	R. Collins, Council's Surveyor, Court House, Enfield	Jan. 15
*Making-up Streets	do.	do.	do
Building Work at Workhouse	Farnham Guardians	Friend & Lloyd, Architects, Aldershot	do.
Sewers, Northfield-lane, &c.	Ealing Borough Council	C. Jones, Civil Engineer, Town Hall, Ealing	do
Sewerage Works, Bargoed and Gilfach	Gelligaer R.D.C.	J. P. Jones, Surveyor, Council Offices, Hengoed	do.
Houses, Birdwell, Yorks	Messrs. Thorpe & Robinson	A. Whitaker, Architect, Worsborough, Barnsley	do.
Three Houses, Birdwell	Mr. T. Greenwood	do.	do.
House, Double Mills	Cockermouth U.D.C.	J. Fearon, Council Offices, Cockermouth	do.
Baths and Gymnasium, Dunfermline		do.	do.
Stone, &c.	Banbury Town Council	T. Dinwiddy, Architect, 12, Croom's-hill, Greenwich, S.E.	Jan. 16
Road Works, Greyhound-lane, Mitcham	Croydon R.D.C.	D. G. Macdonald, Civil Engineer, Rugby	do
Additions to The Hollies, Halfway-street, Sidcup	do.	Buchanan & Bennett, Civil Engineer, 12, Hill-street, Edinburgh	do.
Stone, &c.	Greenwich Guardians	C. R. Hall, Engineer, Congleton	do.
Waterworks	Rugby U.D.C.	P. H. Palmer, Civil Engineer, Town Hall, Hastings	do.
Filter Bed, &c., Arelid	Lochgelly Town Council	M. O'Callaghan, Architect, Letterkenny	do.
Dept, Queen's-road	Congleton Guardians	E. J. Reynolds, Civil Engineer, Barnet	do
Business Premises, Letterkenny, Ireland	Hastings Corporation	W. Matthews, Engineer, 18, French-street, Southampton	Jan. 17
Road Works, Carlton-road	Miss Rooney	G. Wilson, Surveyor, Green Bat, Alnwick	do.
Stonework, &c., Otterbourne Waterworks	Friern Barnet U.D.C.	J. Murray, Civil Engineer, County Buildings, Paisley	do
Paving Works, &c., Market Hill	Southampton Corporation	T. R. Hearne, 23, West-street, Buckingham	do.
Sewerage Works	Alnwick U.D.C.	T. A. Busbridge, Civil Engineer, Spilsby	do.
Culverts and Road Diversion, Turweston	Kilmalcolm (N.B) District Com.	do.	do.
Broken Granite (6,700 tons)	Buckingham R.D.C.	H. Bestwick, County Architect, Chester	Jan. 18
Slag and Gravel (7,000 tons)	Spilsby R.D.C.	Borough Surveyor, Bridge-street, Walsall	do.
Additions to Asylum, Parkside, Macclesfield	do.	T. Barker & Son, Civil Engineers, 5, Bank-street, Bradford	do.
Sewerage Works, Bloxwich	Committee	J. Rees, Architect, Pentre, Glam	do
Warehouse, Clarence Mills, Cleckheaton	Walsall Corporation	A. W. Bradley, Civil Engineer, Bank-street, Bury	Jan. 20
Organ Chamber, &c., Ton Pentre		Wright & Sons, Surveyors, Lancaster	do.
Tramway Depot, Rochdale-road	Bury (Lancs) Corporation	H. Littler, Architect, County Offices, Preston	do.
Church Tower, Bettws-y-Coed		J. L. Smith, Architect, 50, High-street, Merthyr	do.
House, Brownlow-street, Liverpool	Lancs County Council	E. J. Evans, Civil Engineer, Penarth	do.
School, Aberfan	Merthyr Tydfil School Board	H. Williams, Office of Public Works, Dublin	do.
Hospital, Llandough	Penarth U.D.C.	R. M'George, Langholm	do.
Additions to Munster Institute		Gibbs & Flockton, Architects, 15, St. James'-row, Sheffield	do.
Hospital, Eskdale		G. K. Mills, Paddington Station	Jan. 21
Buildings, Change-alley, &c.	Messrs. T. A. Ashton, Limited	W. Nowell Parr, Clifden House, Boston-road, Brentford	do.
Footbridges, Colwall, Twerton and Hirwain	Great Western Railway Company	Council's Surveyor, 242, High-street, Acton	do.
*Making-up Junction-road	Brentford U.D.C.	W. Thurnall, Brook-street, Kennington-road, S.E.	Jan. 22
*Supply of Guernsey Granite and Flints	Acton District Council	Fairbank & Sons, Civil Engineers, Lendal, York	do.
*Pulling down Buildings, Brook-street, S.E.	Lambeth Guardians	Vicar, The Rectory, Luxulyan	do.
Sewerage Works	Marlborough Town Council	A. W. Bradley, Borough Engineer, Town Hall, Bury	do
Restoration, Church, Lockingate, Luxulyan, Cornwall	Vicar and Churchwardens	W. W. Woodward, Engineer, Broom-street, Salford	Jan. 23
Sewers, &c., Warth Fold to Starkies	Bury (Lancs) Corporation	Borough Engineer, Town Hall, Hackney	do.
Firebricks, &c.	Salford Corporation	City Engineer, Town Hall, Hull	do
*Road Making, Kerbing, Paving, &c.	Hackney Borough Council	E. A. Hackett, Civil Engineer, Workhouse, Clonmel	Jan. 24
*Extension of Electric Light Works	Hull Corporation	The Secretary, H.M. Office of Works, Storey's Gate, S.W.	do
Drainage Works at Workhouse	Clonmel (Ireland) Guardians	J. Huxley, Civil Engineer, 17, London-road, Hailsham	Jan. 25
*Enlargement of Head Post Office, Norwich	Commissioners of H.M. Works, &c.	H. Williams, Imperial Chambers, Corn-street, Bristol	Jan. 30
Road Materials, &c.	Hailsham (Sussex) R.D.C.	T. Roderick, Architect, Clifton-street, Aberdeen	Jan. 31
*Petty Sessional Courts and Offices	City and County of Bristol	C. Smith & Son, 164, Friar-street, Reading	No date
Schools, Penygraig, Wales	Ystradfellte School Board	T. Wild, Hollingworth-road, Littleborough	do.
*New Infirmary at Hatfield	Hatfield Union	J. Murray, Surveyor, Kirklinton, near Carlisle	do.
Four Houses, Littleborough, Lancs		Openshaw & Gill, Architects, 6, Fleet-street, Bury	do.
Stabling at Workhouse, Longtown			
Rebuilding Beach Hotel, Hollingworth Lake, Lancs.			

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Draughtsman	Met. Borough Bethnal Green	110*l.*	Jan. 17
*Architectural Assistant	Southwark Council	3*l.* per week	Jan. 20

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv. vi. viii. x & xxii. *Public Appointments, pp.* xviii & xxii.

PRICES CURRENT (*Continued*).

BRICKS, &c.

	£	s.	d.			
Best Blue Pressed Staffordshire ..	4	6	6	per 1,000 at	railway	depot.
Do., Bullnose	4	10	0	,,	,,	,,
Best Stourbridge Fire Bricks	4	4	0	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers.....	13	0	0	,,	,,	,,
Headers	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	17	0	0	,,	,,	,,
Double Stretchers	10	0	0	,,	,,	,,
Double Headers..	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,
Two Sides and one End	20	0	0	,,	,,	,,
Splays, Chamfered, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers and Headers ..	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	14	0	0	,,	,,	,,
Double Stretchers	15	0	0	,,	,,	,,
Double Headers..	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamfered, Squints.....	14	0	0	,,	,,	,,
Seconds Quality White and Dipped Salt Glazed	2	0	0	,,	less than best.	

	s.	d.	
Thames and Pit Sand	7	3	per yard, delivered.
Thames Ballast	6	0	,, ,,
Best Portland Cement	32	0	per ton, delivered.
Best Ground Blue Lias Lime..	25	0	,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime..... 11s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 28s. 0d. per ton at rly. dpt.

STONE.

	s.	d.		
Ancaster in blocks	1	11	per ft. cube, deld.	rly. depôt.
Bath ,, ...	1	7	,,	,,
Farleigh Down Bath ..	1	8	,,	,,
Beer in blocks	1	6½	,,	,,
Grinshill ,, ...	1	10	,,	,,
Brown Portland in blocks	2	2	,,	,,
Darley Dale in blocks..	2	4	,,	,,
Red Corsehill ,,	2	5	,,	,,
Red Mansfield ,,	2	4	,,	,,
Hard York in blocks ..	2	10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup)	2	8	per ft. super. at rly. depôt.	
,, ,, 6 in. Rubbed Ditto..	3	0	,,	,,
,, ,, 5 in. sawn both sides slabs (random sizes)	1	3	,,	,,
,, ,, 2 in. self-faced Ditto	0	9½	,,	,,
Hopton Wood (Hard Bed) in blocks	2	3	per ft. cube. deld. rly. depôt.	
,, ,, ,, 6 in. sawn both sides landings	2	7	per ft. super. deld. rly. depôt.	
,, ,, ,, 3 in. do.	1	2½	,,	,,

SLATES.

in.	in.	£	s.	d.		
20×10	best blue Bangor..	11	15	0	per 1000 of 1200	at ry. dep.
,,	best seconds ,,	11	5	0	,,	,,
16×8	best ,,	6	12	0	,,	,,
20×10	best blue Portmadoc	11	5	0	,,	,,
16×8	best blue Portmadoc	6	0	0	,,	,,
20×10	best Eureka unfading green....	12	2	6	,,	,,
16×8	,, ,,	7	5	0	,,	,,
20×10	permanent green	10	5	0	,,	,,
16×8	,, ,,	5	17	6	,,	,,

TILES.

	s.	d.		
Best plain red roofing tiles..	41	6	per 1,000, at	rly. depôt.
Hip and valley tiles....	3	7	per doz.	,, ,,
Best Broseley tiles	48	6	per 1,000	,, ,,
Hip and valley tiles....	4	0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000	,, ,,
Do. ornamental Do.	60	0	,,	,, ,,
Hip tiles	4	0	per doz.	,, ,,
Valley tiles	3	9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50	9	per 1,000	,, ,,
Hip tiles	4	1	per doz.	,, ,,
Valley tiles.....	3	8	,,	,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.....	13	10	0	15	10	0
Deals: best 3 by 9.....	13	0	0	14	10	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.....	10	0	0	11	0	0
Battens: best 2½ by 6 and 3 by 6 ..	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best		
Battens: seconds	0	10	0	,,	,,	,,
2 in. by 4 in. and 2 in. by 6 in. ..	8	10	0	9	10	0
2 in. by 4½ in. and 2 in by 5 in. ..	8	0	0	9	0	0

PRICES CURRENT (*Continued*).

WOOD.

	At per standard. £	s.	d.	£	s.	d.
Foreign Sawn Boards— 1 in. by 1¼ in. by 1½ in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		
Fir timber: Best middling Danzig or Memel (average specification)	At per load of 50 ft. 4	10	0	5	0	0
Seconds	4	5	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Swedish balks.....	2	15	0	3	0	0
Pitch-pine timber (30 ft.).....	3	0	0	3	10	0
JOINERS' WOOD.	At per standard.					
White Sea: First yellow deals, 3 in. by 11 in.	22	0	0	23	0	0
3 in. by 9 in.	20	0	0	21	0	0
Battens, 2½ in. and 3 in. by 7 in.	15	0	0	16	0	0
Second yellow deals, 3 in. by 11 in.	17	0	0	18	0	0
,, ,, 3 in. by 9 in.	15	10	0	16	10	0
Battens, 2½ in. and 3 in. by 7 in.	12	0	0	13	0	0
Third yellow deals, 3 in. by 11 in. and 9 in.	12	10	0	13	10	0
Battens, 2½ in. and 3 in. by 7 in.	10	10	0	11	10	0
Petersburg: first yellow deals, 3 in. by 11 in.	19	0	0	20	0	0
Do. 3 in. by 9 in.	16	0	0	17	0	0
Battens.....	12	10	0	13	0	0
Second yellow deals, 3 in. by 11 in.....	14	0	0	15	0	0
Do. 3 in. by 9 in.	13	0	0	14	0	0
Battens.....	11	0	0	12	0	0
Third yellow deals, 3 in. by 11 in.....	11	10	0	12	10	0
Do. 3 in. by 9 in.	11	0	0	12	0	0
Battens.....	10	0	0	11	0	0
White Sea and Petersburg :— First white deals, 3 in. by 11 in.	13	10	0	14	10	0
,, ,, ,, 3 in. by 9 in.	12	10	0	13	0	0
Battens.....	10	10	0	11	10	0
Second white deals 3 in. by 11 in.	12	10	0	13	10	0
,, ,, ,, 3 in. by 9 in.	12	0	0	12	10	0
,, ,, ,, battens.....	9	10	0	10	10	0
Pitch-pine: deals	16	0	0	18	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes..	32	0	0	33	10	0
Broads (12 in. and up).....	2	0	0	more.		
Oddments	22	0	0	24	0	0
Seconds, regular sizes	24	10	0	26	10	0
Yellow Pine Oddments	20	0	0	22	0	0
Kauri Pine—Planks, per ft. cube..	0	3	6	0	4	6
Danzig and Stettin Oak Logs— Large, per ft. cube	0	2	6	0	3	0
Small ,, ,, ...	0	2	3	0	2	6
Wainscot Oak Logs, per ft. cube ..	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	8	0	0	7
¾ in. do. do.	0	0	7	-	-	-
Dry Mahogany— Honduras, Tabasco, per ft. sup. as inch	0	0	9	0	0	11
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	0
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	16	0	0	20	0	0
American Whitewood Planks— Per ft. cube.....	0	3	0	0	3	6
Prepared Flooring—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	0	0	16	6
1 in. by 7 in. yellow, planed and matched	0	13	6	0	17	6
1¼ in. by 7 in. yellow, planed and matched	0	15	0	1	0	0
6 in. at 6d. per square less than 7 in.						
1 in. by 7 in. white, planed and shot	0	11	0	0	12	6
1 in. by 7 in. white, planed and matched	0	11	6	0	13	6
1¼ in. by 7 in. white, planed and matched	0	13	6	0	15	6
6 in. at 6d. per square less than 7 in.						

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	6	5	0	7	5	0
Compound Girders ,, ,,	8	0	0	9	0	0
Angles, Tees and Channels, ordinary sections	8	2	6	9	2	6
Flitch Plates	8	10	0	0	0	0
Cast Iron Columns and Stanchions, including ordinary patterns	7	0	0	8	0	0

METALS.

	Per ton, in London. £	s.	d.	£	s.	d.
IRON—						
Common Bars.....	8	0	0	8	10	0
Staffordshire Crown Bars, good merchant quality	8	10	0	9	0	0
Staffordshire "Marked Bars" ..	10	10	0	-	-	
Mild Steel Bars.....	9	0	0	9	10	0
Hoop Iron, basis price.....	9	5	0	9	15	0
,, ,, galvanised.....	16	0	0	-	-	-
(* And upwards, according to size and gauge.)						
Sheet Iron, Black.—						
Ordinary sizes to 20 g.....	10	0	0	-	-	-
,, ,, to 24 g.....	11	0	0	-	-	-
,, ,, to 26 g.....	12	10	0	-	-	-
Sheet Iron, Galvanised, flat, ordinary quality.—						
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	12	10	0	-	-	-
,, ,, 22 g. and 24 g.	13	0	0	-	-	-
,, ,, 26 g.....	14	0	0	-	-	-
Sheet Iron, Galvanised, flat, best quality :—						
Ordinary sizes to 20 g.....	16	10	0	-	-	-
,, ,, 22 g. and 24 g.	17	0	0	-	-	-
,, ,, 26 g.....	18	10	0	-	-	-
Galvanised Corrugated Sheets.—						
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12	10	0	-	-	-
,, ,, 22 g. and 24 g.	13	0	0	-	-	-
,, ,, 26 g.	14	0	0	-	-	-

PRICES CURRENT (*Continued*).

METALS.

	Per ton, in London. £	s.	d.	£	s.	d.
IRON— Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker ..	12	5	0	-	-	-
,, ,, 22 g. and 24 g.	13	5	0	-	-	-
,, ,, 26 g.	14	5	0	-	-	-
Cut nails, 3 in. to 6 in.	9	10	0	10	0	0
(Under 3 in. usual trade extras.)						

LEAD, &c.

	Per ton, in London. £	s.	d.	£	s.	d.
LEAD—Sheet, English, 3 lbs. & up.	13	0	0	-	-	-
Pipe in coils	13	10	0	-	-	-
Soil Pipe.....	16	0	0	-	-	-
ZINC—Sheet—						
Vieille Montagne..... ton	24	10	0	-	-	-
Silesian	24	0	0	-	-	-
COPPER—						
Strong Sheet..... per lb.	0	1	0	-	-	-
Thin ..... ,,	0	1	1½	-	-	-
Copper nails..... ,,	0	1	1½	-	-	-
BRASS—						
Strong Sheet..... ,,	0	0	11	-	-	-
Thin ,, ...	0	1	1	-	-	-
TIN—English Ingots..... ,,	0	1	3	-	-	-
SOLDER—Plumbers' ..... ,,	0	0	6½	-	-	-
Tinmen's ..... ,,	0	0	8	-	-	-
Blowpipe ..... ,,	0	0	9	-	-	-

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2¾d.	per ft.	delivered.
,, fourths	2½d.	,,	,,
21 oz. thirds	3½d.	,,	,,
,, fourths.....	3¼d.	,,	,,
26 oz. thirds	4¾d.	,,	,,
,, fourths	4¼d.	,,	,,
32 oz. thirds	5¾d.	,,	,,
,, fourths	5¼d.	,,	,,
Fluted sheet, 15 oz.....	3¼d.	,,	,,
,, 21 ,, ...	4¼d.	,,	,,
⅛ Hartley's Rolled Plate	2½d.	,,	,,
1/16 ,, ,, ,, ...	3d.	,,	,,
¼ ,, ,, ,, ...	3½d.	,,	,,

OILS, &c.

		d
Raw Linseed Oil in pipes.....	per gallon	0 2 10
,, ,, ,, in barrels	,,	0 2 11
,, ,, ,, in drums	,,	0 3 1
Boiled ,, ,, in pipes	,,	0 3 0
,, ,, ,, in barrels	,,	0 3 1
,, ,, ,, in drums	,,	0 3 3
Turpentine, in barrels	,,	0 2 3
,, in drums	,,	0 2 6
Genuine Ground English White Lead	per ton	21 10 0
Red Lead, Dry	,,	21 0 0
Best Linseed Oil Putty	per cwt.	0 8 6
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £	s.	d.
Fine Elastic Copal Varnish for outside work ..	0	16	6
Best Elastic Copal Varnish for outside work ..	1	0	0
Best Elastic Carriage Varnish for outside work	0	16	0
Best Hard Oak Varnish for inside work.....	0	10	6
Best Extra Hard Church Oak Varnish for inside work	0	10	6
Fine Hard Copal Varnish for inside work.....	0	16	0
Best Hard Copal Varnish for inside work.....	1	0	0
Best Hard Carriage Varnish for inside work....	0	16	0
Extra Pale Paper Varnish	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
Best French and Brush Polish	0	10	0

TO CORRESPONDENTS.

A. W. B. (Amount should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

CHINGFORD.—For new house, Rowden Park Estate Chingford, for Mr. J. J. Spencer. Mr. T. Wilson, architect, 24, New Bridge-street, E.C.:—

Wood*.....£750

[*See also next page.*

CHURSTON FERRERS (Devon).—For the erection of three houses, Galmpton, for Mr. T. B. Bolitho. Mr. W. F. Tollit, architect, Totnes :—

R. E. Narracot, Stoke Gabriel* £784

COLCHESTER.—For the erection of two pairs of cottages on the Tomlinson Estates. Messrs. Start & Rowell, architects, Colchester, and 54, New Broad-street, E.C. :—

Dupont & Co.	£1,238	A. Diss	£1,050
T. J. Ward	1,220	W. Chambers	990
J. Grimes	1,195	R. Beaumont*	920

CORK.—For rebuilding saw mills, for Messrs. Eustace & Co., Limited. Mr. Arthur Hill, architect, 22, Georges-street, Cork. Quantities by Mr. Butler, Dublin :—

M. Lynch	£5,200	Delany & Co.	£4,451
D. Hegarty	4,900	S. Hill	4,380
D. O'Callaghan	4,547	E. & P. O'Flynn*	4,360
P. Murphy	4,455		

CROYDON.—For the construction of sewers, Beddington, Coulsdon, and Mitcham, for the Rural District Council. Messrs. Chart, Son, & Reading, surveyors, Union Bank-chambers, Croydon :—

	Beddington.	Coulsdon.	Mitcham.
Pedrette	£4,900 0 0	£2,860 0 0	£3,400 0 0
Hawkins & Co.	2,310 0 0	1,226 19 6	2,135 15 6
Jackson	2,388 0 0	1,366 19 0	1,843 11 0
Manders	2,228 17 2	1,239 18 0	2,053 2 5
Green	2,532 19 8	1,440 19 8	1,392 19 8
Rayner	2,177 10 6	1,231 0 0	1,772 7 0
Johnson & Langley	2,172 0 0	1,282 0 0	1,535 0 0
Killingbeck & Co.	2,197 0 0	1,277 0 0	1,370 0 0
Langridge	2,010 0 0	1,115 0 0	1,532 0 0
Iles	2,066 0 0	1,128 0 0	1,457 0 0
Streeters & Todhunter	1,895 0 0	1,037 6 9	1,332 3 0
Oseuton, Westerham†	1,738 0 0	1,011 0 0	1,292 0 0

HERNE BAY.—For the erection of twenty-five cottages, Minster Drive, for the Central Cottage Building Club. Mr. E. J. Hammond, C.E., 3, Marlborough-buildings, High-street, Herne Bay :—

C. W. Welby	£6,075	C. Jorden	£5,375
E. T. J. Adams	6,050	J. Wilford	5,125
Berry Bros.	5,575	J. F. Thompson	5,125
L. Seager	5,500	C. S. Smillie	4,875
F. Griggs	5,500	A. S. Ingleton, Herne Bay*	4,750

WATFORD.—For the erection of the New Victoria Boys' School, for Watford School Board. Mr. J. Hunt, architect, 40, Upper Baker-street, N.W. :—

S. W. Moscrip	£8,856 16	J. Appleby	£7,093 0
G. Wiggs	8,298 0	Varnell & Son	7,064 0
Dupont & Co.	8,218 0	C. Eames	6,956 0
Holliday & Greenwood, Ltd.	7,929 0	Honour & Son	6,933 0
Smith & Sons, Ltd.	7,519 0	Clifford & Gough	6,899 0
Tyler & White	7,500 0	G. & J. Waterman	6,867 0
H. Martin	7,308 0	Coulson & Lofts	6,751 18
Martin, Wells, & Co., Ltd.	7,243 0	C. Brightman	6,638 0
Patman & Fotheringham, Ltd.	7,128 0	R. L. Tonge, Watford*	6,508 0
		R. Morton Hughes	6,461 0

For Heating System.

J. Metcalf	£407 0	Wenham & Waters, Ltd., London*	£340 0
Beer & Co.	384 10		
Wontner Smith, Gray, & Co.	377 0		

LONDON.—For the erection of workshop at Great Hermitage-street, Wapping, for Mr. A. W. Birt. Mr. John Parrish, architect and surveyor, Clapton Park, N.E. :—

Alexander Edwards, Cambridge-road* £1,600

NORTHWICH.—For the erection of a house at sewage outfall works, for the Winnington Urban District Council. Messrs. H. Bancroft & Son, C.E., 88, Mosley-street, Manchester :—

T. Appleton, Northwich* £340

WARWICK.—For proposed infirmary at the Warwick Union Workhouse, for the Board of Guardians. Mr. Francis P. Trepess, architect, Warwick. Quantities supplied by the architect :—

Building Estimates.

Fincher & Co.	£15,815 16 0	W. Harvey Gibbs	£13,600 0 0
G. Jackson	15,618 0 0	Whitehouse & Sons	13,575 0 0
J. Bloxham	15,212 14 2	M. Hughes	13,522 0 0
R. Bowen	14,999 0 0	Gowing & Ingram	13,509 0 0
W. Hopkins	14,888 7 10	F. Johnson	13,414 0 0
J. Rowbotham	14,747 0 0	S. Warburton	13,000 0 0
Parnell & Son	14,708 0 0	Smith & Pitts	12,947 0 0
Lindsay & Son	14,514 15 0	Exors. of C. Garlick	12,900 0 0
C. Gray Hill Thompson Bros.	14,352 0 0	W. Faulks	12,767 2 3
Smith & Sons	14,331 0 0	Kelley & Son	12,735 10 0
Pattison & Sons	14,300 0 0	Moss & Sons, Ltd., Loughborough*	12,000 4 1
Giles & Son	14,292 0 0		
E. Talliss	14,196 0 0		
Broad & Son	14,037 18 3		
	13,811 16 10		

Engineering Estimates.

Summerscales & Sons	£3,700 0 0	Williams & Sons, Ltd.	£2,495 2 9
R. & A. Main	3,390 0 0	Coventry Gas Fitting and Engineering Co.	2,475 0 0
Dargue, Griffiths, & Co.	3,280 19 6	Dinning & Cooke	2,462 0 0
Flavel & Co.	3,190 0 0	Jenkins & Son	2,460 0 0
Williams & Sons	2,998 10 0	Bailey & Co.	2,438 0 0
W. Freer	2,884 0 0	Tomlinson & Milam*	2,280 0 0
Benham & Sons	2,852 10 0	A. J. Kallaway	1,800 0 0
Dawson & Co., Ltd.	2,850 0 0		
Moorwood, Sons, & Co., Ltd.	2,798 0 0		

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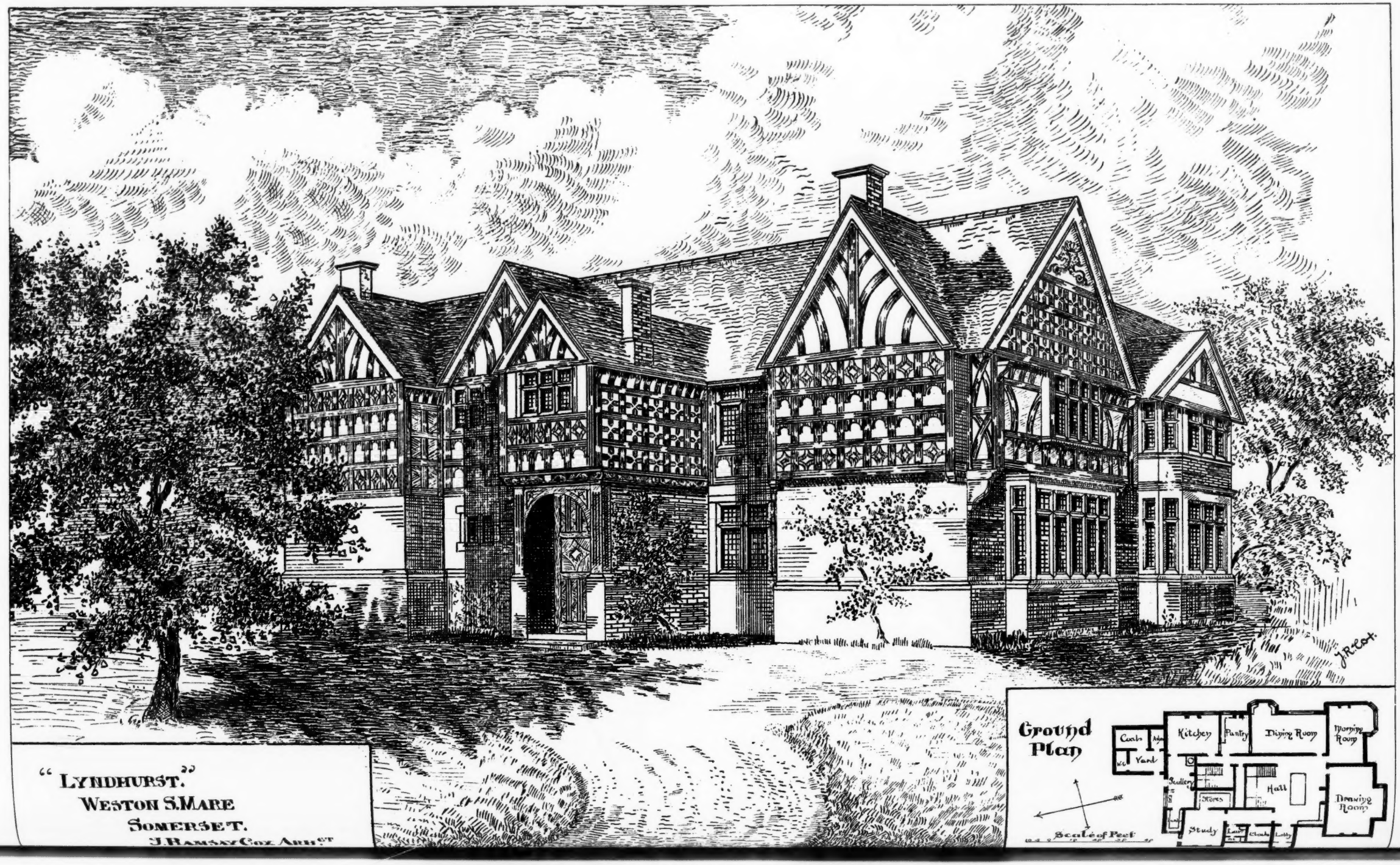

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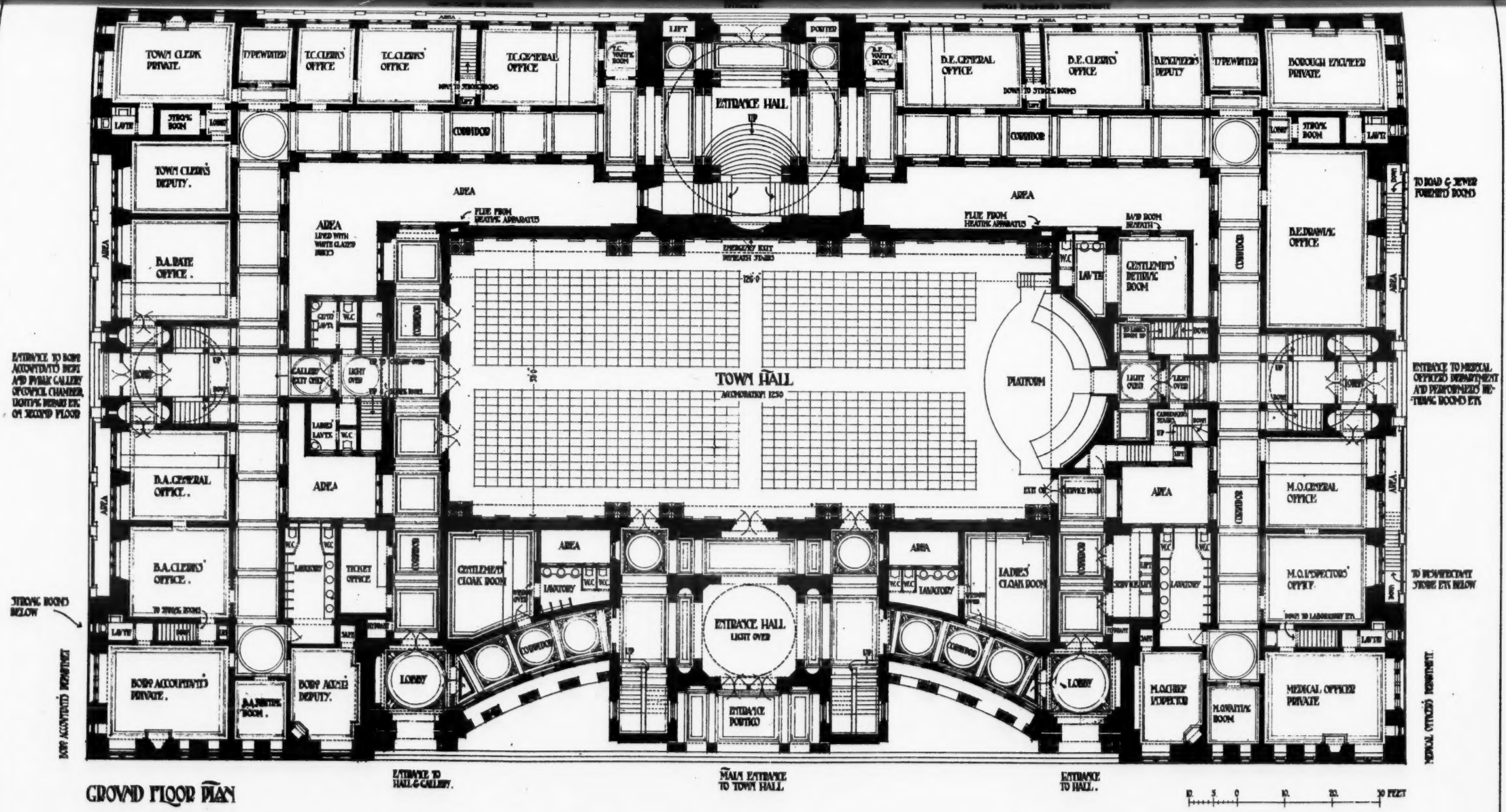

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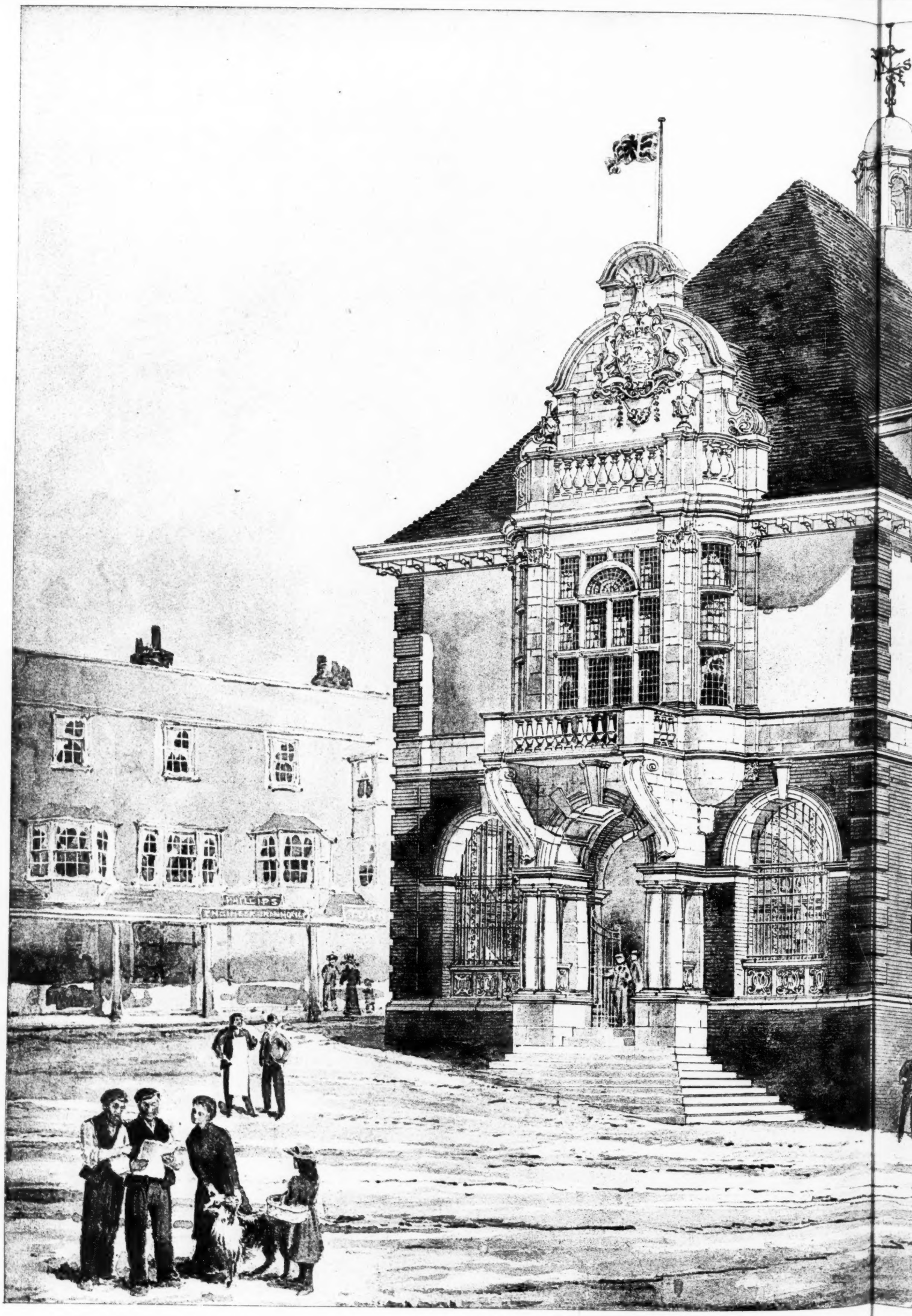

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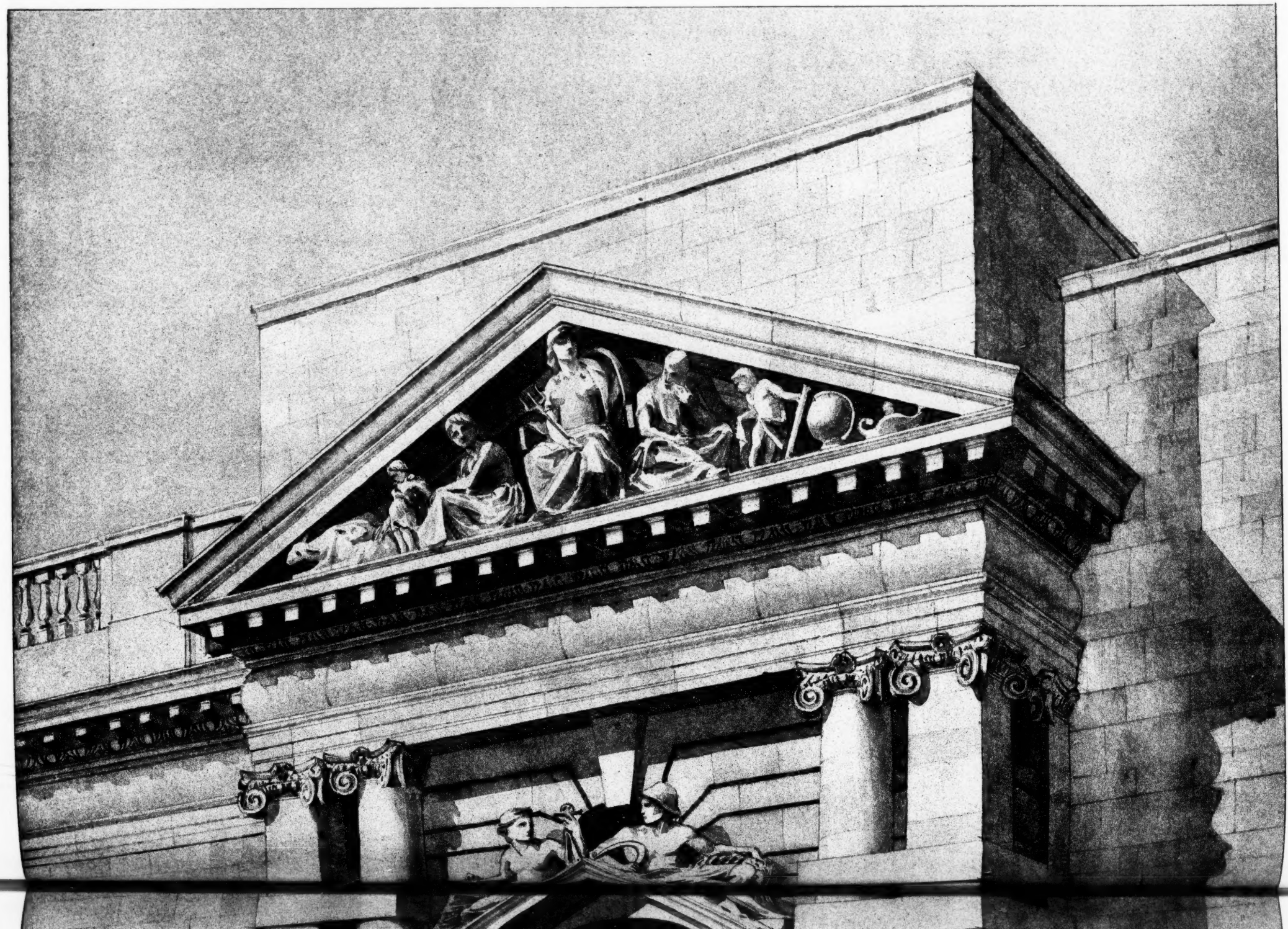

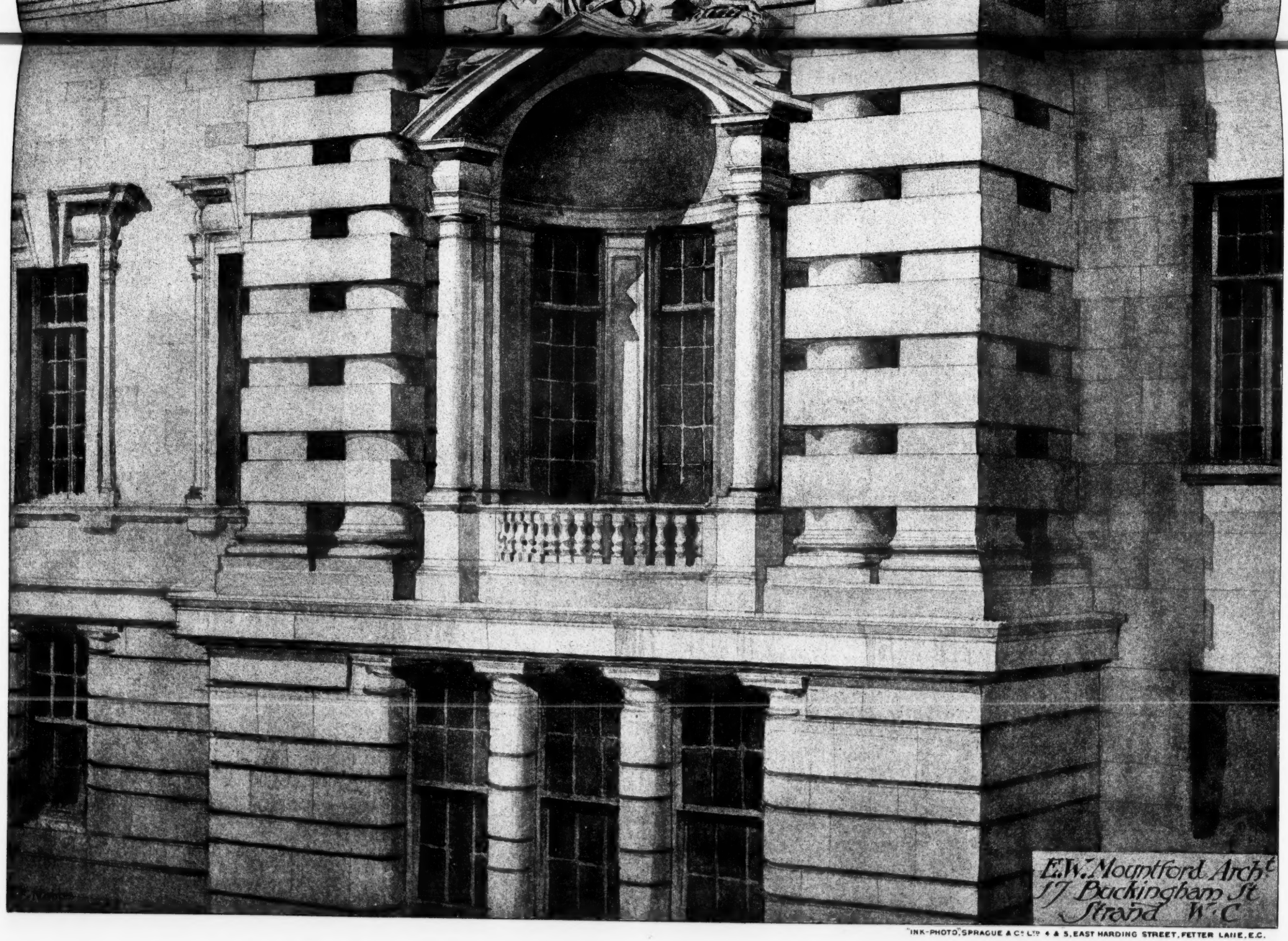

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